Nikon

AUTO OPTESTER OT-8A

Instructions

NIKON CORPORATION

TOKYO, JAPAN

Cautions

- Lens

  (1) Take care not to leave dust or fingerprint on the lens surface.

  (2) Use a soft lens brush to remove dust.

  (3) To remove dirt or fingerprints, use a well-washed soft cotton cloth or lens cleaning paper moistened with a small amount of alcohol or lens cleaning liquid. Do not rub the lens too hard.

  (4) Do not use a handkerchief or absorbent cotton wool for cleaning the lens.

- Power source

  (1) If you turn OFF the power switch on the OT-8A control panel, wait for at least 5 seconds before turning it ON again. If the plug of the power supply cord is disconnected while the power switch is ON, wait for at least 5 seconds before connecting the plug again.

  (2) Set the power voltage to be used into the voltage indicator window of the fuse holder at the rear of the control panel.

  (3) Take the position of the plug to put in or put out the power source cable.

  (4) The symbols indicated on the power supply unit have the following meaning:

POWER switch

○	OFF (disconnection from the power)
|	ON (connection to the power)

Power input panel

~	Alternating current (AC)	⚠	See "Cautions" and "Instructions"
⊟	Fuse	🚹	B-type equipment

- Storage and room conditions

  (1) The OT-8A control panel has a vent in the case to keep the internal parts cool. Do not block the vent.

  (2) Do not store or use the instrument in direct sunlight or near heating equipment.

  (3) Do not store or use the instrument in a damp or dusty place.

  (4) This instrument is a precision instrument. Do not drop or jar it. Do not store or use the instrument where it may be jarred or shaken.

  (5) Danger: Take care not to let any liquid (such as water) or metal parts into this instrument.

  (6) Do not place anything heavy on the OT-8A control panel during use or storage.

(7) Use of the instrument next to a radio or television may cause noise on the radio or television. If a device generates a strong magnetic field nearby, it may cause error in the instrument.

(8) Do not disassemble to the instrument. If the instrument is disassembled, no warranty will be provided.

• Others

Use a soft cloth moistened with water or detergent liquid. Do not use benzine or thinner or other volatile chemicals, because the instrument cover may be dissolved or change color. Do not spray insecticide over the instrument.

• If the instrument becomes faulty

When the instrument becomes faulty, overheats, or its function is abnormal, disconnect the plug of the power supply cord. Then contact the Nikon service personnel.

Equipment Supplied

1) OT-8A lens chamber × 1
2) OT-8A control panel × 1
3) Near point chart holder × 1
4) Near point chart scale × 1
5) Near point chart × 1
6) Control panel fuse × 2
7) Printing form × 5
8) Vinyl cover for lens chamber × 1
9) Power cord
10) Connection cord lens chamber

} Incorporated in OS-300 when this auto optester is to be purchased together with connection cord the opthalmic console system OS-300.

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1. Names of Parts

1-1. Lens Chamber

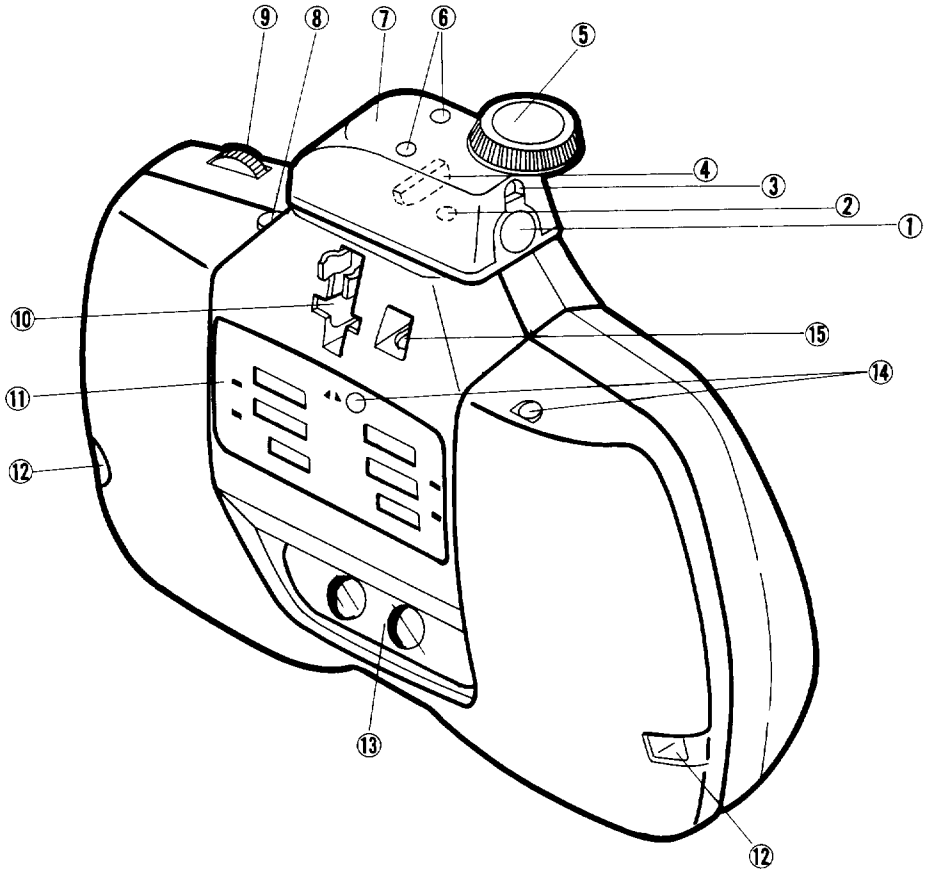


Figure 1-1

(1) Pole arm mounting port (⇒ P.5)
(2) Stopper screw hole (⇒ P.5)
(3) Connection cord hole (⇒ P.5)
(4) Connection cord connector (⇒ P.5)
(5) Arm fixing knob (⇒ P.5)
(6) Cover fixing screw hole (⇒ P.5)
(7) Hanger cover (⇒ P.5)
(8) Leveling knob (⇒ P.6)
(9) Forehead rest adjustment knob
(10) Reading rod mounting port (⇒ P.6)
(11) Lens chamber display (⇒ P.13)
(12) Corneal distance window (⇒ P.9)
(13) Sight aperture
(14) Remote control transmission window
(15) Level (⇒ P.6)

1-2. Control Panel

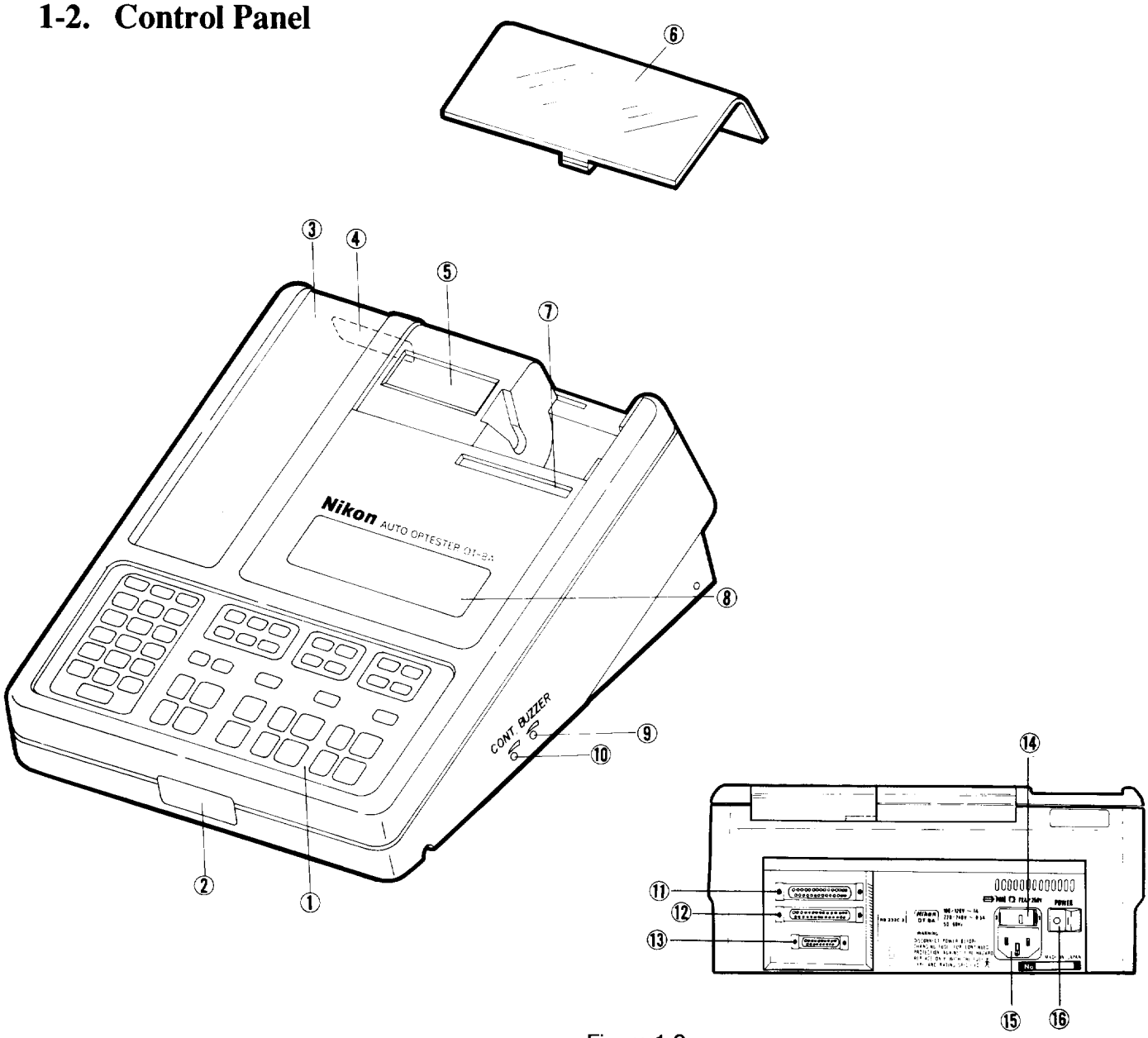


Figure 1-2

(1) Keyboard (⇒ P.14)

*(2) Remote control receiving window (⇒ P.47)
*(3) Remote control rest
*(4) Rear remote control receiving window (⇒ P.47)
(5) IC card reader/writer (optional accessory) mounting part (⇒ P.55)
(6) Printer cover
(7) Printing form outlet (⇒ P.7)
(8) LC display

(9) Buzzer volume adjustment knob (⇒ P.5)
(10) Liquid crystal contrast adjustment knob (⇒ P.59)
(11) External interface connector 1
(12) External interface connector 2

(13) Connector for lens chamber connection cord (⇒ P.5)
(14) Fuse holder (⇒ P.59)
(15) Power cord socket (⇒ P.5)
(16) POWER switch

(* Remote control is optional accessory)

2. *Setting*

2-1. Installing the Lens Chamber

(1) Insert the end of the pole arm into the OT-8A pole arm mounting opening.

(2) Rotate the OT-8A lens chamber 90° against the pole arm; the stopper screw hole appears on the bottom of the OT-8A hanger.

(3) Fix the stopper screw into a hole threads of the pole arm from this hole. The OT-8A is then fixed.

Note: Do not forget to tighten the stopper screw.

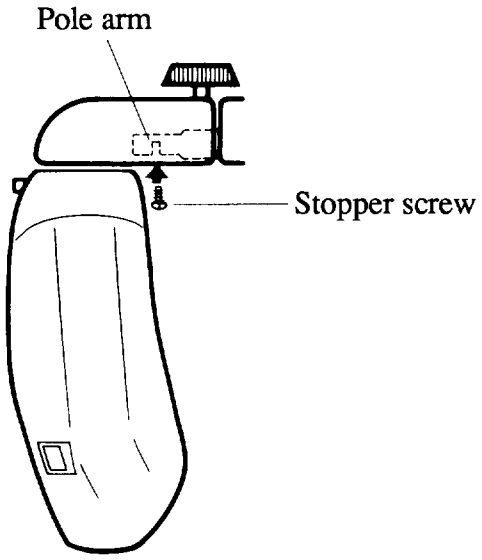


Figure 2-1

2-2. Connecting the Cord

(1) Remove the OT-8A arm fixing knob. Remove two fixing screws, then remove the lens chamber hanger cover.

(2) Fix the connector for lens chamber connection cord to the lens chamber and control panel.

(3) Tighten setscrew (standard & Phillips screw) with a screwdriver to secure the connector firmly. The connector is then connected.

(4) Mount the lens chamber hanger cover. Tighten two cover setscrews of the cover.

(5) Tighten the arm fixing knob.

(6) Connect the power cord socket of the control panel to the AC power outlet with the accessory power cord.

2-3. Mounting the Near Point Chart

(1) Insert the end of the scale rod into the mounting portion in the center of the lens chamber.

Note: Insert the scale rod from the oblique-upper side.

(2) Insert the chart holder from another end of the scale rod.

(3) Secure the chart to the holder at two points with screws.

[Either keep the scale standing or remove it, in cases other than near view measurement.]

2-4. Leveling

Turn the leveling knob to set the lens chamber in the level state while observing the level of the OT-8A lens chamber with the mirror at the upper side.

2-5. Turn on the POWER Switch

Turn on the power switch (press the switch indicator, "|"); the lens chamber enters the initial state as shown below in a few seconds, enabling key operation.

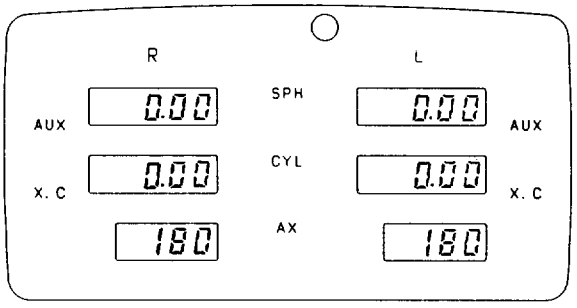


Figure 2-2

2-6. Replacing the Paper Roll

(1) Insert the paper (correct side up) end deep inside from the paper inlet.

(2) Keep the power supply ON, then press the FEED key of the control panel. The paper is further fed.

(3) Pass the white rod through the paper roll and fit both the rod's ends into the slots.

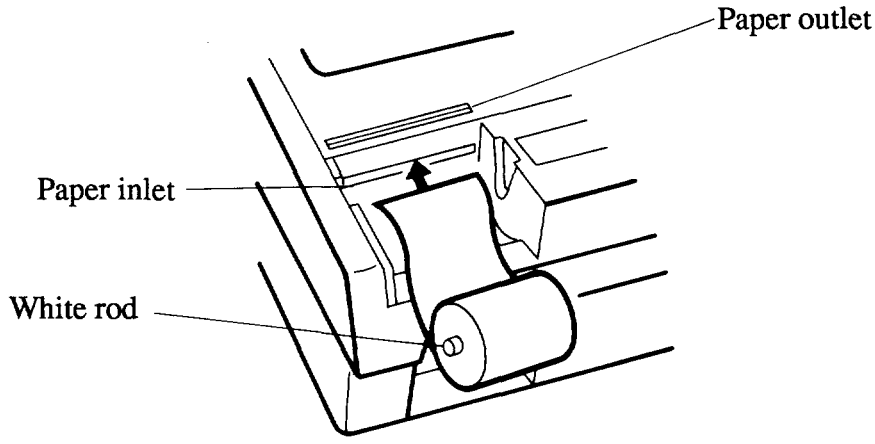


Figure 2-3

Notes:

1) Feed the paper before fitting the paper roll. If the paper roll is first fit, paper feed cannot be made.

2) Do not insert the paper upside down.

3) If the PRINT key is pressed before paper insertion is complete, the printer prints without paper and the print head may be damaged.

4) Do not allow foreign matter into the printer or the paper may jam.

5) Store paper away from heat and humidity.

6) In any case, if you are going to store the data for a long time, make a photo-copy and store that. The printing from this unit might deteriorate over time.

3. *Adjusting the Corneal Distance*

3-1. Adjusting the Corneal Distance by Normal Measurement

For normal measurement, set the corneal distance of the patient to the position shown in Figure 3-3 while observing the OT-8A corneal distance window.

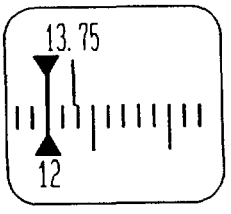


Figure 3-1

Make sure line 12 is on the triangle base mark

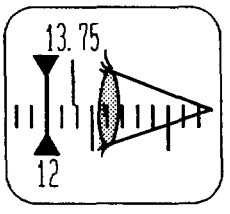


Figure 3-2

⇒ Turn the forehead rest adjustment knob while watching the corneal distance position of patient

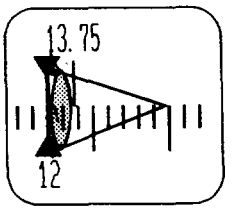


Figure 3-3

⇒ Adjust the position of the corneal distance to line 12 (At this time, the corneal distance is 12 mm)

If corneal (wearing) distance is different for the test and for the dispensed spectacles, convert the test result (if more than 5 diopters) according to the diopter conversion table in Section 3.2 (pages 9 and 10).

Example:

When SPH-9.00D was obtained with the corneal distance of 12 mm, and spectacles are dispensed for a wearing distance of 15 mm, the prescription is as follows.

(1) "(–) lens" because it is –9.00D. "3 mm away" because 12 mm → 15 mm

(2) Follow the line of "test result 9.00D" rightward.

(3) Select the column "(–) lens distance by 3 mm."

(4) SPH –9.25D is the prescription for the spectacles.

3-2. Diopter Conversion Table

Diopter (D) compensated by change in corneal distance (Change corneal distance: 1-6 mm)

Test result (D)	Change corneal distance (mm)											
	Longer in case of (+) lens Shorter in case of (−) lens						Shorter in case of (+) lens Longer in case of (−) lens					
	1	2	3	4	5	6	1	2	3	4	5	6
									Example			
4.50	4.48	4.46	4.44	4.42	4.40	4.38	4.52	4.54	4.56	4.58	4.60	4.62
5.00	4.98	4.95	4.93	4.90	4.88	4.85	5.03	5.05	5.08	5.10	5.13	5.15
5.50	5.47	5.44	5.41	5.38	5.35	5.32	5.53	5.56	5.59	5.62	5.66	5.69
6.00	5.96	5.93	5.89	5.86	5.83	5.79	6.04	6.07	6.11	6.15	6.19	6.22
6.50	6.46	6.42	6.38	6.34	6.30	6.26	6.54	6.59	6.63	6.67	6.72	6.76
7.00	6.95	6.90	6.86	6.81	6.76	6.72	7.05	7.10	7.15	7.20	7.25	7.31
7.50	7.44	7.39	7.33	7.28	7.23	7.18	7.56	7.61	7.67	7.73	7.79	7.85
8.00	7.94	7.87	7.81	7.75	7.69	7.63	8.06	8.13	8.20	8.26	8.33	8.40
8.50	8.43	8.36	8.29	8.22	8.15	8.09	8.57	8.65	8.72	8.80	8.88	8.96
Example→9.00	8.92	8.84	8.76	8.69	8.61	8.54	9.08	9.17	9.25	9.34	9.42	9.51
9.50	9.41	9.32	9.24	9.15	9.07	8.99	9.59	9.68	9.78	9.88	9.97	10.07
10.00	9.90	9.80	9.71	9.62	9.52	9.43	10.10	10.20	10.31	10.42	10.53	10.64
10.50	10.39	10.28	10.18	10.08	9.98	9.88	10.61	10.73	10.84	10.96	11.08	11.21
11.00	10.88	10.76	10.65	10.54	10.43	10.32	11.12	11.25	11.38	11.51	11.64	11.78
11.50	11.37	11.24	11.12	10.99	10.87	10.76	11.63	11.77	11.91	12.05	12.20	12.35
12.00	11.86	11.72	11.58	11.45	11.32	11.19	12.15	12.30	12.45	12.61	12.77	12.93
12.50	12.35	12.20	12.05	11.90	11.76	11.63	12.66	12.82	12.99	13.16	13.33	13.51
13.00	12.83	12.67	12.51	12.36	12.21	12.06	13.17	13.35	13.53	13.71	13.90	14.10
13.50	13.32	13.15	12.97	12.81	12.65	12.49	13.68	13.87	14.07	14.27	14.48	14.69
14.00	13.81	13.62	13.44	13.26	13.08	12.92	14.20	14.40	14.61	14.83	15.05	15.28
14.50	14.29	14.09	13.90	13.71	13.52	13.34	14.71	14.93	15.16	15.39	15.63	15.88
15.00	14.78	14.56	14.35	14.15	13.95	13.76	15.23	15.46	15.71	15.96	16.22	16.48
15.50	15.26	15.03	14.81	14.60	14.39	14.18	15.74	16.00	16.26	16.52	16.80	17.09
16.00	15.75	15.50	15.27	15.04	14.81	14.60	16.26	16.53	16.81	17.09	17.39	17.70
16.50	16.23	15.97	15.72	15.48	15.24	15.01	16.78	17.06	17.36	17.67	17.98	18.31
17.00	16.72	16.44	16.18	15.92	15.67	15.43	17.29	17.60	17.91	18.24	18.58	18.93
17.50	17.20	16.91	16.63	16.36	16.09	15.84	17.81	18.13	18.47	18.82	19.18	19.55
18.00	17.68	17.37	17.08	16.79	16.51	16.25	18.33	18.67	19.03	19.40	19.78	20.18
18.50	18.16	17.84	17.53	17.23	16.93	16.65	18.85	19.21	19.59	19.98	20.39	20.81
19.00	18.65	18.30	17.98	17.66	17.35	17.06	19.37	19.75	20.15	20.56	20.99	21.44
19.50	19.13	18.77	18.42	18.09	17.77	17.46	19.89	20.29	20.71	21.15	21.61	22.08
20.00	19.61	19.23	18.87	18.52	18.18	17.86	20.41	20.83	21.28	21.74	22.22	22.73

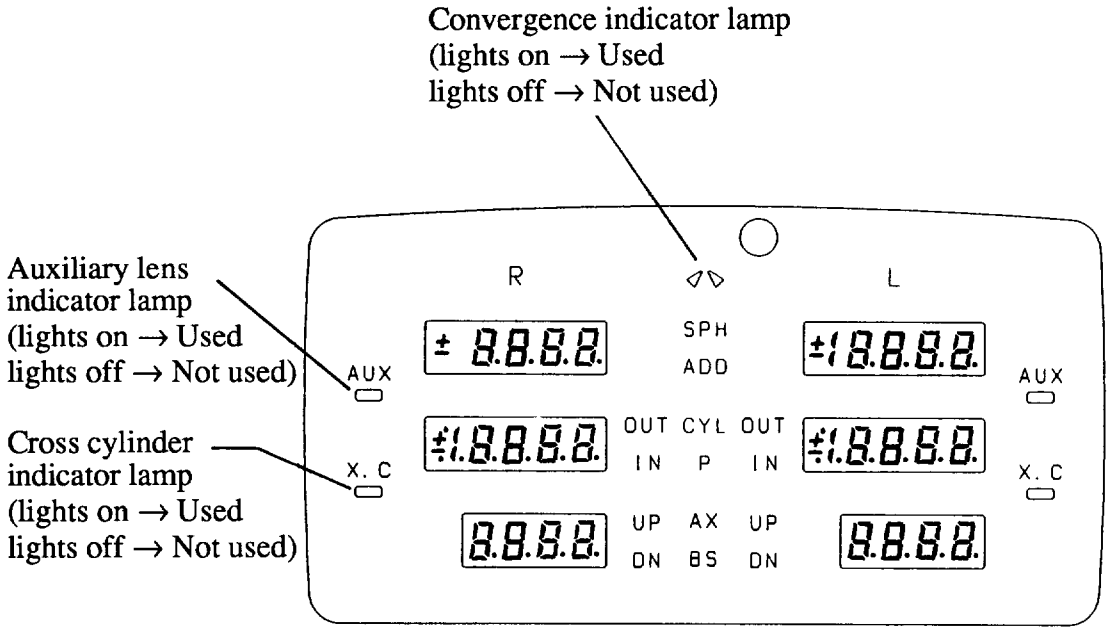
Diopter (D) compensated by change in corneal distance (Change corneal distance: 7-12 mm)

Test result (D)	Change corneal distance (mm)											
	Longer in case of (+) lens Shorter in case of (−) lens						Shorter in case of (+) lens Longer in case of (−) lens					
	7	8	9	10	11	12	7	8	9	10	11	12
4.50	4.36	4.34	4.32	4.31	4.29	4.27	4.64	4.67	4.69	4.71	4.73	4.76
5.00	4.83	4.81	4.78	4.76	4.74	4.72	5.18	5.21	5.24	5.26	5.29	5.32
5.50	5.30	5.27	5.24	5.21	5.19	5.16	5.72	5.75	5.79	5.82	5.85	5.89
6.00	5.76	5.73	5.69	5.66	5.63	5.60	6.26	6.30	6.34	6.38	6.42	6.47
6.50	6.22	6.18	6.14	6.10	6.07	6.03	6.81	6.86	6.90	6.95	7.00	7.05
7.00	6.67	6.63	6.59	6.54	6.50	6.46	7.36	7.42	7.47	7.53	7.58	7.64
7.50	7.12	7.08	7.03	6.98	6.93	6.88	7.92	7.98	8.04	8.11	8.17	8.24
8.00	7.58	7.52	7.46	7.41	7.35	7.30	8.47	8.55	8.62	8.70	8.77	8.85
8.50	8.02	7.96	7.90	7.83	7.77	7.71	9.04	9.12	9.20	9.29	9.38	9.47
9.00	8.47	8.40	8.33	8.26	8.19	8.12	9.61	9.70	9.79	9.89	9.99	10.09
9.50	8.91	8.83	8.75	8.68	8.60	8.53	10.18	10.28	10.39	10.50	10.61	10.72
10.00	9.35	9.26	9.17	9.09	9.01	8.93	10.75	10.87	10.99	11.11	11.24	11.36
10.50	9.78	9.67	9.59	9.50	9.41	9.33	11.33	11.46	11.60	11.73	11.87	12.01
11.00	10.21	10.11	10.00	9.91	9.81	9.72	11.92	12.06	12.21	12.36	12.51	12.67
11.50	10.64	10.53	10.42	10.31	10.21	10.11	12.51	12.67	12.83	12.99	13.17	13.34
12.00	11.07	10.95	10.83	10.71	10.60	10.49	13.10	13.27	13.45	13.64	13.82	14.02
12.50	11.49	11.36	11.24	11.11	10.99	10.87	13.70	13.89	14.08	14.29	14.49	14.71
13.00	11.92	11.78	11.64	11.50	11.37	11.25	14.30	14.51	14.72	14.94	15.17	15.40
13.50	12.33	12.18	12.03	11.89	11.75	11.61	14.91	15.13	15.37	15.61	15.85	16.11
14.00	12.75	12.59	12.43	12.28	12.13	11.99	15.52	15.77	16.02	16.28	16.55	16.83
14.50	13.16	12.99	12.83	12.66	12.51	12.35	16.14	16.40	16.68	16.96	17.25	17.55
15.00	13.57	13.39	13.22	13.04	12.88	12.71	16.76	17.05	17.34	17.65	17.96	18.29
15.50	13.98	13.79	13.60	13.42	13.24	13.07	17.39	17.69	18.01	18.34	18.69	19.04
16.00	14.39	14.18	13.97	13.79	13.60	13.42	18.02	18.35	18.69	19.05	19.42	19.80
16.50	14.79	14.57	14.37	14.16	13.97	13.77	18.65	19.01	19.38	19.76	20.16	20.57
17.00	15.19	14.96	14.74	14.53	14.32	14.12	19.30	19.68	20.07	20.48	20.91	21.36
17.50	15.59	15.35	15.12	14.89	14.68	14.46	19.94	20.34	20.77	21.21	21.67	22.15
18.00	15.96	15.73	15.49	15.25	15.03	14.80	20.59	21.03	21.48	21.95	22.44	22.96
18.50	16.38	16.11	15.86	15.61	15.37	15.14	21.25	21.71	22.20	22.70	23.23	23.78
19.00	16.77	16.49	16.23	15.97	15.72	15.47	21.91	22.41	22.92	23.46	24.02	24.61
19.50	17.16	16.87	16.59	16.32	16.06	15.80	22.58	23.10	23.65	24.22	24.82	25.46
20.00	17.54	17.24	16.95	16.67	16.39	16.13	23.26	23.81	24.39	25.00	25.64	26.32

4. *How to Use Keys*

4-1. Lens Chamber Display and Control Panel Keyboard

(1) Lens chamber display



(This figure shows all lamps on)

Figure 4-1

(2) Control panel keyboard

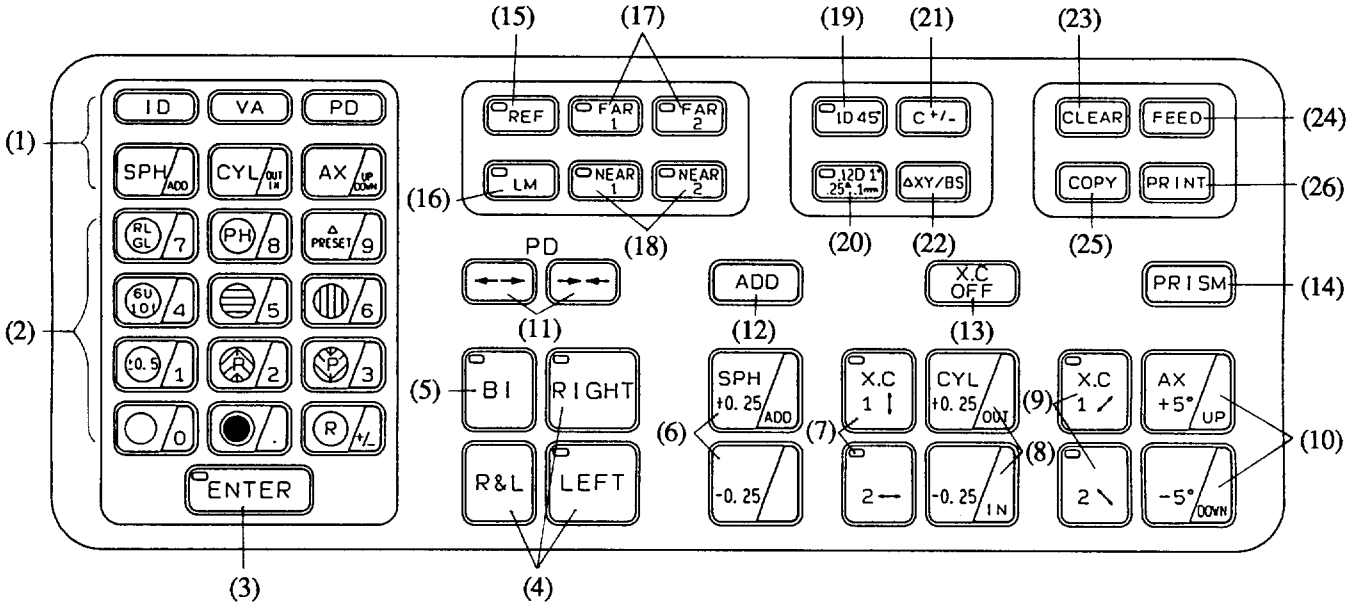
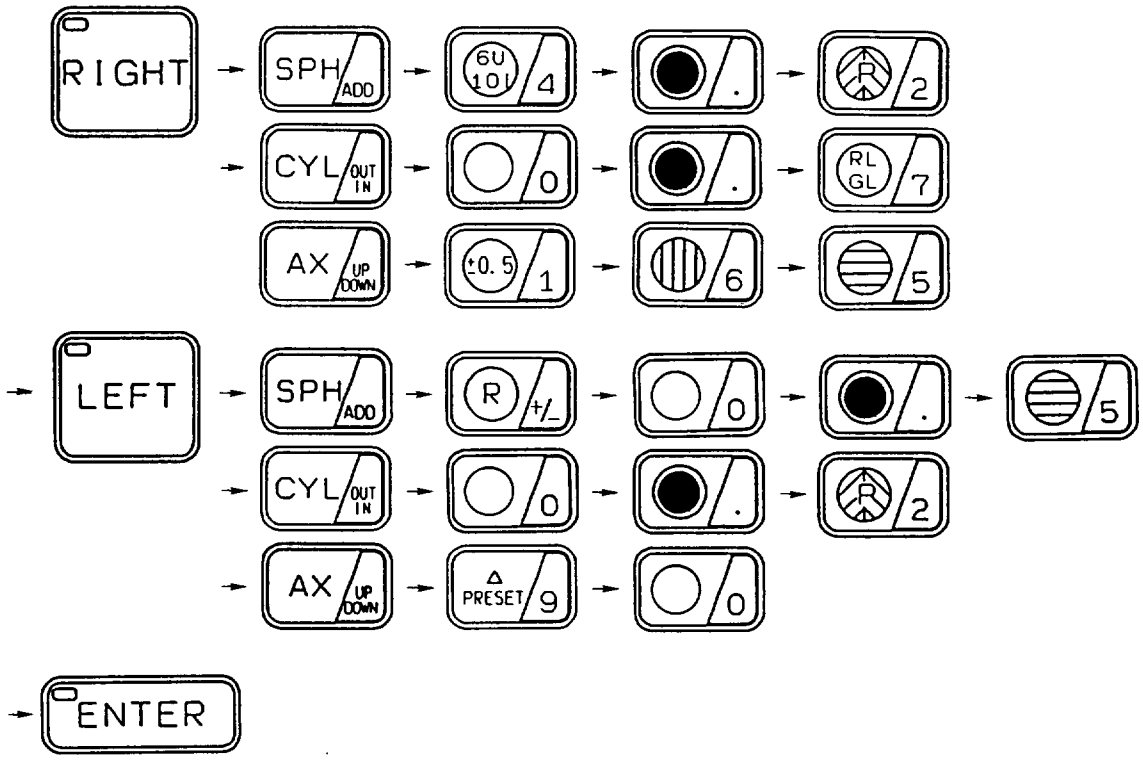


Figure 4-2

(1) Data selector keys
(2) Auxiliary lens/ten keys
(3) ENTER key
(4) RIGHT and LEFT keys
(5) Binocular sight key
(6) Spherical power +/–0.25D step keys
(7) Cross cylinder keys for cylindrical power
(8) Cylindrical power +/– 0.25D step keys
(9) Cross cylinder keys for cylindrical axis
(10) Cylindrical axis +/– 5° step keys
(11) PD keys
(12) ADDITION key
(13) Cross cylinder OFF key
(14) PRISM key
(15) Auto ref. data input key
(16) Auto lensmeter data input key
(17) FAR keys
(18) NEAR keys
(19) Step key (1) (Coarse step)
(20) Step key (2) (Fine step)
(21) Cylindrical power transposition key
(22) XY/BS key
(23) CLEAR key
(24) PAPER FEED key
(25) COPY key
(26) PRINT key

4-2. Data Input Example

Example: R S–4.25, C–0.75, Ax 165°
L S+0.50, C–0.25, Ax 90°
For above data input, press keys in the following sequence:



Notes:

1) If any one SPH/ADD, CYL/OUT IN, *or* AX/UP DOWN *key is pressed, then another* SPH/ADD, CYL/OUT IN, *or* AX/UP DOWN *or* ENTER *key is pressed without pressing the ten key, the data is reset to the original and the lens in the sight aperture remains unchanged. (Note that the data, once entered, will not return to the original.)*

2) When the SPH/ADD, CYL/OUT IN, *or* AX/UP DOWN *key is pressed, the tenkey pad acts as "–" in the standard state. The tenkey pad acts as "+" when the* R/+/- *key is pressed.*

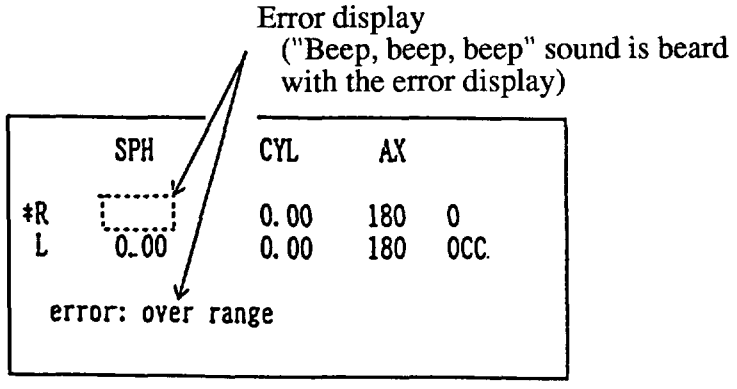
Specification of the standard state as "+" is possible. (Contact your Nikon representative.)

4-3. If an Error is Displayed

- Data input is possible within the following input range. Error is displayed on the LC display of the control panel when the input data is over range.

  When error is displayed, press again the corresponding SPH/ADD, CYL/OUT IN, or AX/UP DOWN key. Then, re-enter the data with the tenkey pad.

Error display example:



[Input range]

- SPH −28.50 ~ +26.75D
- CYL −7.00 ~ +7.00D

  (Note however that $-28.50D \leqq SPH + \frac{CYL}{2} \leqq +26.75D$)

- AX 0 ~ 180°
- Prism

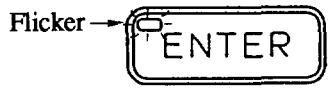
For XY indication	PX	−20.00 ~ +20.00
	PY	−20.00 ~ +20.00
For R or θ indication	P	0 ~ +20.00
	BS	0 ~ 360°

(Note however that $-20.00 \leqq \sqrt{PX^2 + PY^2} \leqq +20.00$)

4-4. If Wrong Data is Entered

When the data is found to be wrong during entry, press again the SPH/ADD , CYL/OUT , or AX/LP key for which wrong data is being entered. Re-enter the data with the ten key pad.

Note: *The LED lamp of the ENTER key flickers to indicate that data input is under way.*

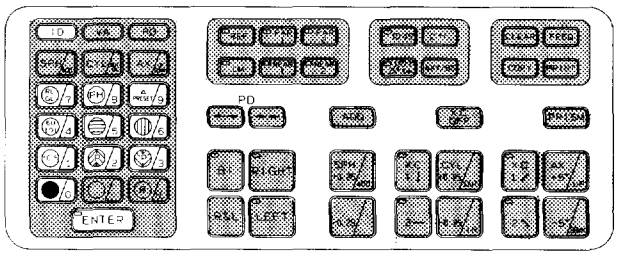


While this lamp flickers, the lens cannot be moved with other keys such as SPH +0.25/ADD .

4-5. Functions of Each Key

(1) Identification (ID) number
Set or change the ID number for identifying each customer.

Use the marked keys.



To set or change an ID number:

Press the [ID] key; letters ID appear on the LC display of the control panel.

Enter the required ID number of up to 10 digits using the ten key.

Operator panel key	Function	LC display on control panel	Lens chamber display example
[ID]	Displays letters ID on the LC display of the control panel. This unit is placed into the ID number entry wait state.	SPH CYL AX *R 0.00 0.00 180 0 L 0.00 0.00 180 0 ID	R 0.00 SPH 0.00 CYL PdR 180 A X 32.0
Ten key	Used to enter an ID number with up to 10 digits.	SPH CYL AX *R 0.00 0.00 180 0 L 0.00 0.00 180 0 ID 1234567890	No change
[ENTER]	Stores the entered ID number.	SPH CYL AX *R 0.00 0.00 180 0 L 0.00 0.00 180 0 ID display disappears	No change

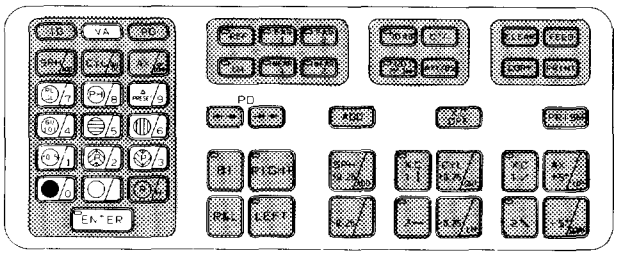
Notes:

1) If you press a wrong key by mistake, just start again from the first step.

2) When this OT-8A Auto Optester interfaces with the Nikon Auto Refractometer NR-5000 or NR-5100, the ID number of the meter is stored if no ID number is set using the OT-8A.

(2) Entering the visual acuity (VA)
Set or change the visual acuity.

Use the marked keys.



To set or change the visual acuity:

Press the [VA] key. → Letters VA appear on the LC display of the control panel.

Enter the visual acuity with number 0.01- 9.9 using the ten key.

Operator panel key	Function	LC display on control panel	Lens chamber display example
[VA]	Displays letters VA on the LC display of the control panel.This unit is placed into the visual acuity entry wait state.	SPH CYL AX VA *R -2.00 -0.25 180 0 L -1.50 0.00 180 OCC 0.0 The blank part is in the entry wait state.	R -2.00 SPH -0.25 CYL PdR 180 A X 32.0
Ten key	Used to enter the visual acuity.	SPH CYL AX VA *R -2.00 -0.25 180 0 1.0 L -1.50 0.00 180 OCC 0.0	No change
[ENTER]	Stores the entered visual acuity.	No change	No change

Notes:

1) If you press a wrong key by mistake, just start again from the first step.

2) The visual acuity value for the right, left, and right and left eyes can be stored in the FAR1, FAR2, NEAR1, or NEAR2 mode.

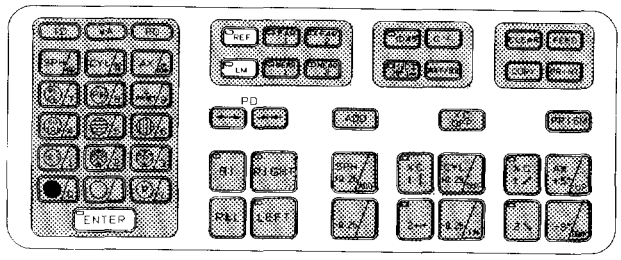
3) While the SPH, CYL, and AX values are left initialized and before data is entered, the visual acuity of naked eye (VAN) can be entered. The procedure is the same.

SPH CYL AX VAN
*R 0.00 0.00 180 0
L 0.00 0.00 180 OCC 0.0

The blank part is in the entry wait state.

(3) Calling data from another unit
Data can be called from the auto refractometer or auto lensmeter.

Use the marked keys.



1) To call data of the auto refractometer:

Press the REF key. → Data is called from the auto refractometer and appears on the LC display of the control panel.

LED lamp ON → REF

Operator panel key	Function	LC display on control panel	Lens chamber display example
REF	Calls data from the auto refractometer and displays it on the LC display of the control panel. ON → REF Flicker → ENTER	SPH CYL AX *R -2.00 -0.25 180 0 L -1.50 0.00 180 OCC	
ENTER	Sets the lens corresponding to the displayed data into the sight aperture.	No change	R -2.00 SPH -0.25 CYL PdR 180 A X 32.0

2) Calling data of the auto lensmeter:

Press the LM key. → Data is fetched from the auto lensmeter and appears on the LC display of the control panel.

Operator panel key	Function	LC display on control panel	Lens chamber display example
LM	Receives data from the auto lensmeter. ON → LM → Press the LM key. → The OT-8A fetches the data and displays it on the LC display of the control panel. Flicker → ENTER	SPH CYL AX *R -2.00 -0.25 180 0 L -1.50 0.00 180 0	
ENTER	Sets the lens corresponding to the displayed data into the sight aperture.	No change	R -2.00 SPH -0.25 CYL PdR 180 A X 32.0

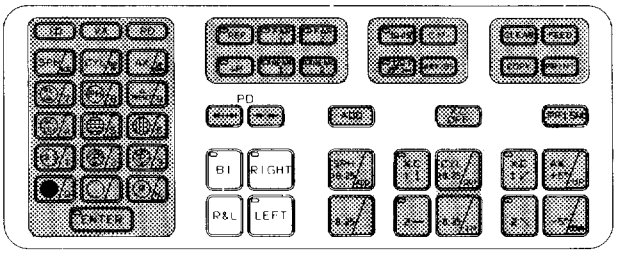
Notes:

1) Data can be called only from the Nikon Auto Refractometer NR-5000, NR-5100, or NR-7000 and Nikon Auto Lensmeter NL-2 or NL-30.

2) To fetch data, initialize the value, then correctly connect the OT-8A to the auto refractometer or lensmeter. (Contact your Nikon representative.)

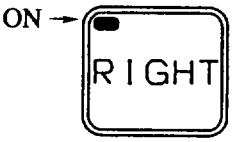
(4) Selecting the right or left eye
Select whether the right, left, or right and left eyes are measured.

Use the marked keys.



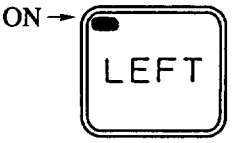
1) Press the RIGHT key.

→ Only the right eye is measured and the occluder is set for the left eye.



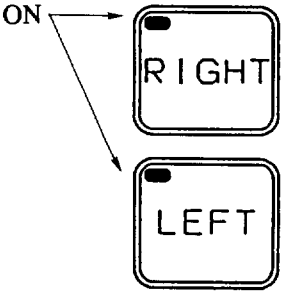
2) Press the LEFT key.

→ Only the left eye is measured and the occluder is set for the right eye.



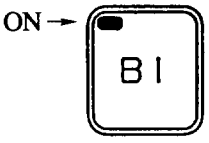
3) Press the R&L key.

→ Both the right and left eyes are measured.



4) Press the BI key.

→ The automatic occluder setting by the RIGHT or LEFT key is released and binocular measurement will be possible.

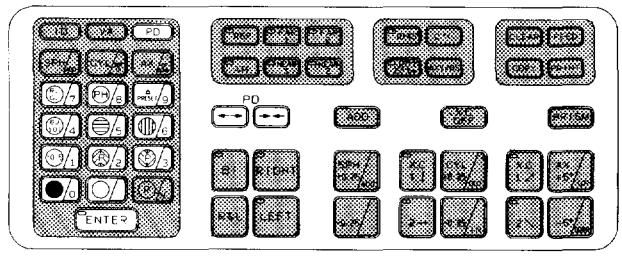


Operator panel key	Function	LC display on control panel	Lens chamber display example
RIGHT	Automatically sets the auxiliary lens to ROL●. ON for right eye only. ON → RIGHT	SPH CYL AX *R -2.00 -0.25 180 0 L -1.00 0.00 180 OCC	R -2.00 SPH -0.25 CYL 180 AX
LEFT	Automatically sets the auxiliary lens to R●LO. ON for left eye only. ON → LEFT	SPH CYL AX R -2.00 -0.25 180 OCC *L -1.00 -0.25 180 0	L SPH -1.00 CYL -0.25 AX 180
R&L	Automatically sets the auxiliary lens to ROLO. ON for both right and left eyes. ON → RIGHT, LEFT	SPH CYL AX *R -2.00 -0.25 180 0 *L -1.00 -0.25 180 0	R L -2.00 SPH -1.00 -0.25 CYL -0.25 180 AX 180
BI	Releases the automatic auxiliary lens setting O●. The eye specified by the RIGHT or LEFT key is measured. ON → BI If the BI key is pressed again, its function is released.		

(5) PD

Set or change the pupil distance (PD).

Use the marked keys.



Enter data for each eye.

1) To slightly move the pupil distance:

Press the PD keys. → The pupil distance for one eye moves on a 1 mm base. If these keys are held down, the pupil distance changes continuously.

[Press the key. → The pupil distance for one eye moves on a 0.1 mm base. (See item (12), "Changing the Step.")]

2) To widely move the pupil distance (when setting the PD value which you know in advance):

Press the PD key. → Letters PD appear on the LC display of the control panel and the PD value can be entered using the ten key.

Operator panel key	Function	LC display on control panel	Lens chamber display example
PD	This unit is placed into the PD value entry wait state; letters PD appear on the LC display of the control panel.	SPH CYL AX *R 0.00 0.00 180 0 L 0.00 0.00 180 OCC Entry wait state PD R [ ] L 33.0	R 0.00 SPH 0.00 CYL 180 A X
Ten key	Used to enter the PD value for each eye.	SPH CYL AX *R 0.00 0.00 180 0 L 0.00 0.00 180 OCC PD R 34.0 L 33.0	No change
ENTER	Sets the pupil distance in the sight aperture to the entered PD value.	SPH CYL AX *R 0.00 0.00 180 0 L 0.00 0.00 180 OCC	R 0.00 SPH 0.00 CYL PdR 180 A X 34.0

Notes:

1) *If you press a wrong key by mistake, just start again from the first step.*

2) *The PD value for each eye can be entered within the range of 25.0 to 40.0 and up to the first decimal place.*

3) *The lens chamber display is made for R or L which is not used. If another key is pressed, the PD display disappears.*

4) *When the R&L key is pressed, the lens chamber display indicates the PD value and then changes to the power indication.*

5) *In the following cases, the PD value for each eye is set to 32.0 mm:*

   - *After the power is turned on*
   - *After the* [PRINT] *key is pressed*
   - *After the* [CLEAR] *key is pressed*

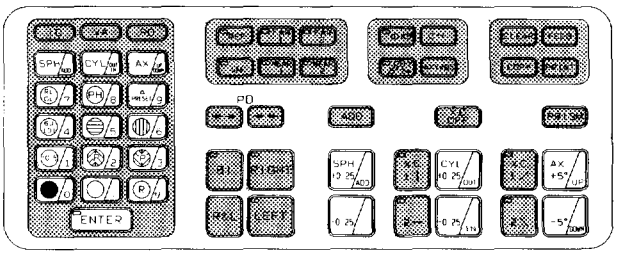
6) *Pressing the* [NEAR 1], [NEAR 2], *or* [ADD] *key automatically places the lens chamber into the convergence state and narrows the pupil distance for each eye by 2.2 mm.*

   (See item (10), "Using the ADD Key" and item (11), "Using Data Memory.")

7) *Changing the initial value enables the user to set the total pupil distance for the right and left eyes. (Contact your Nikon representative.)*

(6) SPH, CYL, and AX
Set or change the spherical power, cylindrical power, and cylindrical axis.

Use the marked keys.



1) To slightly move S, C, and AX:

Press the SPH +0.25 ADD key. → The spherical lens moves by +0.25D.

Press the -0.25 key. → The spherical lens moves by –0.25D.

Press the CYL +0.25 OUT key. → The cylinder lens moves by +0.25D.

Press the -0.25 IN key. → The cylinder lens moves by –0.25D.

Press the AX +5° UP key. → The cylindrical axis moves by +5°.

Press the -5° DOWN key. → The cylindrical axis moves by –5°.

Notes:

1) Holding down the key changes the value continuously.

2) Press the 0.12 1° 2.5 1mm *key.*

→ SPH and CYL moves by ±0.12D; AX moves by ±1 °.

Press the 1D 45° *key.*

→ SPH and CYL moves by ±1D; AX moves by 45 °. (See item (12), "Changing the Step.")

3) When the ADD *or* PRISM *key is pressed, each key is used as the ADD or prism operation key. (See item (9), "Using the Prism" and item (10), "Using ADD.")*

2) To largely move S, C, and AX (when setting the S, C, and AX value you know in advance):

Press the SPH/ADD key. → The SPH value on the LC display of the control panel disappears. Enter the required spherical power using the ten key.

Press the CYL/OUT IN key. → The CYL value on the LC display of the control panel disappears. Enter the required cylindrical power using the ten key.

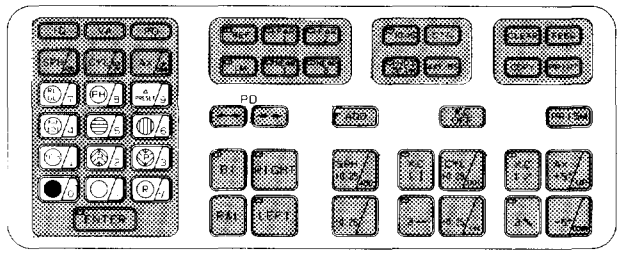
Press the AX/UP DOWN key. → The AX value on the LC display of the control panel disappears. Enter the required cylindrical axis using the ten key.

Operator panel key	Function	LC display on control panel	Lens chamber display example
SPH/ADD CYL/OUT IN AX/UP DOWN	The already specified value on the LC display disappears. This part is placed into the entry wait state.	SPH CYL AX *R 0.00 180 0 L 0.00 0.00 180 0 Entry wait state	R 0.00 SPH 0.00 CYL PdR 180 A X 32.0
Ten key	Used to enter a numeric value.	SPH CYL AX *R -6.00 0.00 180 0 L 0.00 0.00 180 0	No change
ENTER	Sets the lens corresponding to the entered value into the sight aperture.	No change	R -6.00 SPH 0.00 CYL PdR 180 A X 32.0

Note: *If you press a wrong key by mistake, just start again from the first step.*

(7) Auxiliary lens

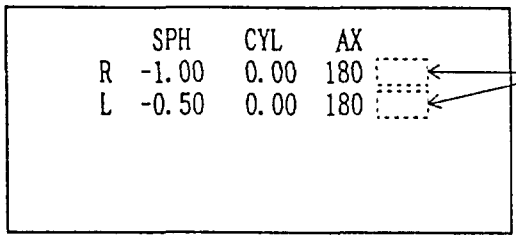
Use the marked keys.



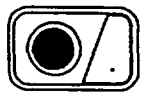
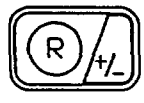
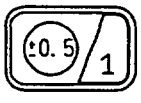
These keys can be used to set the auxiliary lens as follows.

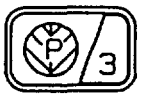
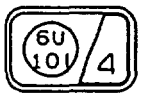
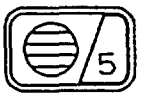
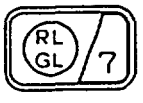
When the auxiliary lens is set, the auxiliary lens use indicator lamp of the lens chamber lights on. (When the auxiliary lens is opened or set, this lamp does not light on.)

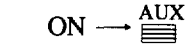
ON → AUX



The contents of the auxiliary lens appear on the LC display of the control panel.

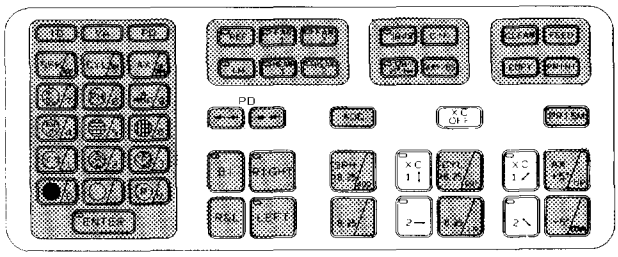
Operator panel key	Function	LC display on control panel	Lens chamber display example
OPEN key	The auxiliary lens is opened in the sight aperture.	0	
 OCCLUDER key	One eye is occluded.	OCC	
 RETINOSCOPY key	The +1.5D lens is set for retinoscopy in the sight aperture. If the set value is changed, the +2D lens may be set. (Contact your Nikon representative.)	R	ON → AUX
 FIXED CROSS CYLINDER key	The ±0.5D cross cylinder lens for presbyopia is set in the sight aperture. The minus axis is in the 90° direction and the plus axis in the 180° direction.	X.C	ON → AUX

Operator panel key	Function	LC display on control panel	Lens chamber display example
 POLARIZING FILTER key	The polarizing filter is set in the right and left sides (for both eyes) of the sight aperture regardless of RIGHT or LEFT key operation. Binocular sight. Polarizing axis: Right eye = 45° Left eye = 135° ("/ \" shaped direction)	P1	ON → AUX
 POLARIZING FILTER key	The polarizing filter is set in the right and left sides (for both eyes) of the sight aperture regardless of RIGHT or LEFT key operation. Binocular sight. Polarizing axis: Right eye = 135° Left eye = 45° ("\ /" shaped direction)	P2	ON → AUX
 6U10I key	The prism below is set in the sight aperture. Right eye = 6ΔB. U. (The view chart lowers by 6Δ prisms.) Left eye = 10ΔB. I. (The view chart shifts outward by 10Δ prisms.) When this key is pressed, the prism mode is not set.	6U 10I	ON → AUX
 HORIZONTAL MADDOX key	The maddox below is set in the sight aperture. Right eye = Horizontal red maddox rod (A light point is shown as a vertical red beam.) Left eye = Horizontal white maddox rod (A light point is shown as a vertical white beam.)	RMH - (Abbre. of Red Maddox Horizontal) WMH - (Abbre. of White Maddox Horizontal)	ON → AUX
 VERTICAL MADDOX key	The maddox below is set in the sight aperture. Right eye = Vertical red maddox rod (A light point is shown as a horizontal red beam.) Left eye = Vertical white maddox rod (A light point is shown as a horizontal white beam.)	RMV - (Abbre. of Red Maddox Vertical) WMV - (Abbre. of White Maddox Vertical)	ON → AUX
 RED FILTER/GREEN FILTER key	The filter below is set in the sight aperture regardless of RIGHT or LEFT key operation. Right eye = Red filter Left eye = Green filter Binocular sight	RL (Abbre. of Red Lens) GL (Abbre. of Green Lens)	ON → AUX

Operator panel key	Function	LC display on control panel	Lens chamber display example
 PIN HOLE key	The pin hole plate is set in the sight aperture.	PH (Abbre. of Pin Hole)	
 PRISM PRESET key	While the LED lamp of the key lights on, press the key;. the prism below is set and this unit is automatically placed into the prism mode. (For measurement of vertical phoria) FAR / NEAR Right 3ΔB.U. / 3ΔB.U. Left 10ΔB.I. (Equivalent to auxiliary lens) / 10ΔB.I. (Equivalent to auxiliary lens)	SPH CYL AX *R -0.75 -0.25 180 0 L -1.00 -0.50 180 10I PX PY *R 0.00BI 3.00BU L 0.00BI 0.00BD	R ON AUX 0.00IN PdR 3.00UP 32.0
	While the LED lamp of the key lights on, press the key; the prism below is set and this unit is automatically placed into the prism mode. (For measurement of lateral phoria) FAR / NEAR Right 6ΔB.U. (Equivalent to auxiliary lens) / 6ΔB.U. (Equivalent to auxiliary lens) Left 15ΔB.I. / 10ΔB.I.	SPH CYL AX R -0.75 -0.25 180 6U *L -1.00 -0.50 180 0 PX PY R 0.00BI 0.00BD *L 15.00BI 0.00BD	AUX ON L PdL IN 0.00 32.0 UP 3.00
	While the LED lamps of the and keys light on by pressing the key, if the key is pressed, the mode remains unchanged.		

(8) Using the cross cylinder
Measure the cylindrical power and cylindrical axis using the ±0.5D cross cylinder lens.

Use the marked keys.



1) To measure the cylindrical power:

Press the X.C 1 | key. → The cross cylinder lens is set in the plus (+) cylindrical power direction.

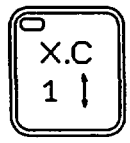
Press the 2— key. → The cross cylinder lens is set in the minus (–) cylindrical power direction.

2) To measure the cylindrical axis:

Press the X.C 1 / key. → The cross cylinder lens is set in the direction 45° to the cylindrical axis.

Press the 2\ key. → The cross cylinder lens is set in the direction 135° to the cylindrical axis.

When the cylindrical power is 0, if the X.C 1 |, 2—, X.C 1 /, or 2\ key is pressed, this unit is automatically placed into the extra cross cylinder mode. (See Page 33.)

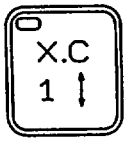
Operator panel key	Function	LC display on control panel	Lens chamber display example
 Cross cylinder key 1 for cylindrical power	The cross cylinder lens is set in the sight aperture in the plus (+) cylindrical power direction.	SPH CYL AX *R -2.00 -0.25 180 0 L -1.00 -0.50 180 0	R -2.00 SPH X.C -0.25 CYL -1- 180 A X
Cross cylinder key 2 for cylindrical power	The cross cylinder lens is set in the sight aperture in the minus (–) cylindrical power direction.	No change	R -2.00 SPH X.C -0.25 CYL -2- 180 A X
Cross cylinder key 1 for cylindrical axis	The cross cylinder lens is set in the direction 45° to the cylindrical axis.	No change	R -2.00 SPH X.C -0.25 CYL 180 A X -1-
Cross cylinder key 2 for cylindrical axis	The cross cylinder lens is set in the direction 135° to the cylindrical axis.	No change	R -2.00 SPH X.C -0.25 CYL 180 A X -2-
Cross cylinder OFF key	The cross cylinder lens disappears from the sight aperture.	No change	R -2.00 SPH -0.25 CYL 180 A X

Notes:

1) The cross cylinder lens may be set to ±0.25D at initialization. (Contact your Nikon representative.)

2) When the cross cylinder lens is set, the LED lamp (X.C) indicating that the cross cylinder lens is currently used lights on and the number (1 or 2) indicating which cross cylinder is used is highlighted on the lens chamber display.

When the cylindrical power is 0D, the cross cylinder keys operate as follows.

Operator panel key	Function	LC display on control panel	Lens chamber display example
 Cross cylinder key 1 for cylindrical power	The minus cylindrical axis of the cross cylinder lens is set in the 90° direction. If the key is pressed, C-0.25D, AX90° is added.	SPH CYL AX *R -2.00 0.00 180 0 L -1.00 0.00 180 0 << EXTRA X.C>>	R -2.00 SPH X.C 0.00 CYL 180 A X
Cross cylinder key 2 for cylindrical power	The minus cylindrical axis of the cross cylinder lens is set in the 180° direction. If the key is pressed, C-0.25D, AX180° is added.	No change	R -2.00 SPH X.C 0.00 CYL 180 A X
Cross cylinder key 1 for cylindrical axis	The minus cylindrical axis of the cross cylinder lens is set in the 45° direction. If the key is pressed, C-0.25D, AX45° is added.	No change	R -2.00 SPH X.C 0.00 CYL 180 A X
Cross cylinder key 2 for cylindrical axis	The cross cylinder lens is set in the sight aperture in the direction 135° to the cylindrical axis. If the key is pressed, C-0.25D, AX135° is added.	No change	R -2.00 SPH X.C 0.00 CYL 180 A X

Note:

1) When the cross cylinder lens is set, the LED lamp (X.C) indicating that the cross cylinder lens is currently used and the LED lamp (☰) indicating the cross cylinder lens axis direction light on in the lens chamber display.

Measuring the cylindrical power precision with the cross cylinder lens

(1) Show one character from 0.5 to 0.6 on the view chart or cross cylinder chart to the patient.

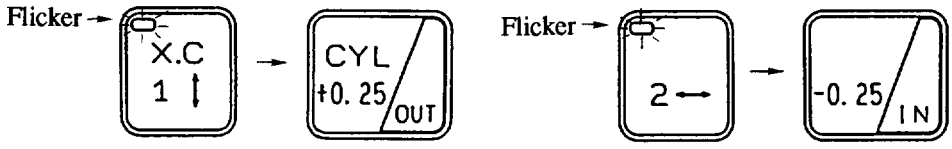
(2) Alternately press the cross cylinder No.1

and

keys for cylindrical power to allow the patient to compare visibility. (Ask the patient which is easier to see, 1 or 2.)

(3) Press a key for which the patient reported sharp visibility. Press either the CYL+0.25 or –0.25 key on the right side.

[Press the CYL+0.25 or CYL–0.25 key on the right side of the flickering key.]



Repeat steps 2 and 3.

(In this case, the sphere is automatically compensated so that $\frac{S+C}{2}$ always becomes constant.)

(To cancel this function, contact your Nikon representative.)

(4) If the same visibility is obtained for both keys, the cylindrical power is determined.

(5) In the same way, measure the cylindrical axis.

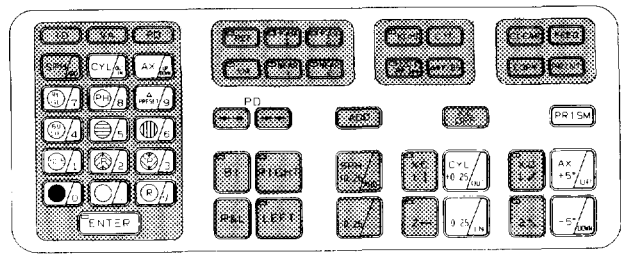
Make the measurement in the order of cylindrical power → cylindrical axis → cylindrical power; the good precision is obtained.

(6) To release the cross cylinder lens, press the

key.

(9) Using the Prism
Set or change the prism power.

Use the marked keys.



Press the [PRISM] key. → The R&L prism is measured in binocular vision state regardless of the [RIGHT] and [LEFT] keys.

Each key has the following function:

[CYL +0.25 OUT] key → 0.5Δ BASE OUT key

[-0.25 IN] key → 0.5Δ BASE IN key

[AX +5° UP] key → 0.5Δ BASE UP key

[-5° DOWN] key → 0.5Δ BASE DOWN key

[CYL OUT IN] key → BASE OUT or IN data specification key

[AX UP DOWN] key → BASE UP or DOWN data specification key

If the [PRISM] key is pressed again, the prism measurement state is released and the prism disappears from the sight aperture.

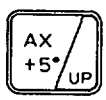
1) To move the prism power a little at one time:

Press the

key. → 0.5Δ BASE OUT is added.

Press the

key. → 0.5Δ BASE IN is added.

Press the 

key. → 0.5Δ BASE UP is added.

Press the

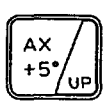
key. → 0.5Δ BASE DOWN is added.

Notes:

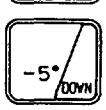
1) When the key is held down, the value changes continuously.

2) When the

key is pressed, if the AX key is pressed, the following state is obtained:

Press the 

key. → *Right eye = 0.5Δ BASE UP is added.*
Left eye = 0.5Δ BASE DOWN is added.

Press the 

key. → *Right eye = 0.5Δ BASE DOWN is added.*
Left eye = 0.5Δ BASE UP is added.

3) Press the

key.→ The prism power moves in a 0.25Δ step.

4) Press the

key. → The prism display unit is converted. (See item (14), "Prism Conversion.")

2) To move the prism power largely at one time:

Press the CYL/OUT IN key. → The BASE IN or BASE OUT value disappears from the LC display of the control panel and this unit is placed into the data entry wait state.

Press the AX/UP DOWN key. → The BSE DOWN or UP value disappears from the LC display of the control panel and this unit is placed into the data entry wait state.

Operator panel key	Function	LC display on control panel	Lens chamber display example
PRISM	Allows the prism measurement. The binocular vision state is set regardless of RIGHT or LEFT key operation.	SPH CYL AX *R -2.00 -0.25 180 0 *L -1.50 0.00 180 0 PX PY *R 3.00BI 3.00BD *L 1.00BI 2.00BU	R L 3.00IN IN 1.00 3.00DN UP 2.00
CYL/OUT IN AX/UP DOWN	The numeric value specified by the key disappears from the LC display. This blank part is placed into the data entry wait state.	SPH CYL AX *R -2.00 -0.25 180 0 *L -1.50 0.00 180 0 PX PY *R 3.00BD *L 2.00BU Entry wait state	No change
Ten key	Used to enter a numeric value.	SPH CYL AX *R -2.00 -0.25 180 0 *L -1.50 0.00 180 0 PX PY *R 5.00BI 3.00BD *L 5.00BI 2.00BU	No change
ENTER	The lens corresponding to the entered data is set in the sight aperture.	No change	R L 5.00IN IN 5.00 3.00DN UP 2.00

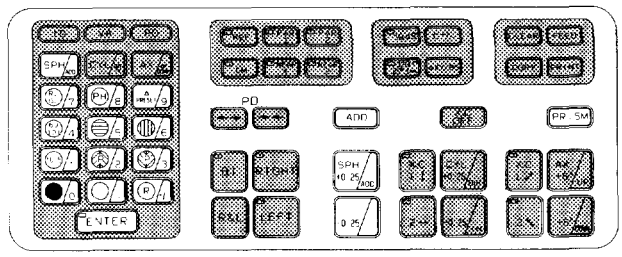
Note: *Press the R/+/- key for the following switching:*

BASE IN ↔ BASE OUT

BASE DOWN ↔ BASE UP

(10) Using ADD
Set or change the ADD power.

Use the marked keys.



Press the [ADD] key. → The lens chamber is placed into the convergence state and the pupil distances of the right and left sides automatically narrow 2.2 mm respectively.

Each key has the following function:

[SPH +0.25 ADD] → ADD power +0.25D key

[-0.25] → ADD power –0.25D key

[SPH ADD] → ADD power data specification key

When the [ADD] key is pressed again, the convergence state is released and returns to the original.

Note: *When the pupil distances of the right and left sides are within 27.2 mm respectively, they are set to 25.0 mm respectively.*

1) To move the ADD power a little at one time:

Press the [SPH +0.25 ADD] key. → +0.25D is added.

Press the [-0.25] key. → –0.25D is added.

Notes:

1) Holding down the key changes the value continuously.

2) When the [.12 .25 1 1mm] key is pressed, the the ADD power moves in a 0.12D step.

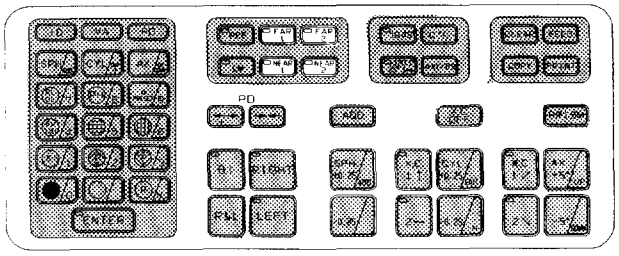
2) To move the ADD power largely at one time:

Press the SPH/ADD key. → The specified ADD power disappears from the LC display of the control panel and this unit is placed into the data entry wait state.

Operator panel key	Function	LC display on control panel	Lens chamber display example
ADD	The lens chamber is automatically placed into the convergence state and the left and right PDs narrow 2.2 mm respectively. The SPH +0.25/ADD and -0.25 keys are used for addition. The SPH/ADD key is used as data specification key for addition.	SPH CYL AX *R -2.00 -0.25 180 0 L -1.50 0.00 180 OCC ADD *R +1.00 L +1.50	R ◀▶ +1.00 ADD
SPH/ADD	The specified ADD power disappears from the LC display of the control panel and this unit is placed into the data entry wait state.	SPH CYL AX *R -2.00 -0.25 180 0 L -1.50 0.00 180 OCC ADD *R ← Enter wait L +1.50 state	
Ten key	Used to enter a numeric value. Press the R/+/- key; the positive and negative signs are switched. If the R/+/- key is not pressed, the positive sign (+) is automatically set.	SPH CYL AX *R -2.00 -0.25 180 0 L -1.50 0.00 180 OCC ADD *R +5.00 L +1.50	No change
ENTER	The lens corresponding to the entered data is set in the sight aperture.	No change	R ◀▶ +5.00 ADD PdR 32.0

(11) Using data memory

Use the marked keys.



Press the [FAR 1] key. → Ordinarily measure the complete corrected power using the FAR1 key.

Press the [FAR 2] key. → After the measurement of the complete corrected power ends, measure the actual value with spectacles on using the FAR2 key.

Press the [NEAR 1] key. → In the same way, measure the value for near using the NEAR1 and NEAR2 keys. Pressing lens chamber the NEAR1 or NEAR2 key automatically places the into the convergence state.

Press the [NEAR 2] key.

When another FAR or NEAR memory key is pressed, the data is stored in the previous memory key and the LED lamp of the previous memory key lights on.

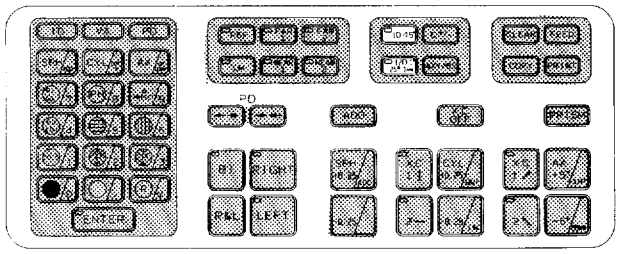
The LED lamps of the [REF], [LM], [FAR 1], [FAR 2], [NEAR 1], and [NEAR 2] keys have the following meaning:

Flicker → = Being used ON → = Data is stored

Note: *When the OT-8A is not connected to the auto lensmeter, the* [LM] *key may be used as memory key.*

(12) Changing the step

Use the marked keys.



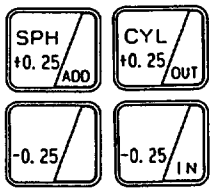
1) For fine step

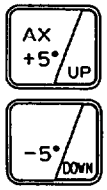
Press the key. → The key step becomes fine as follows:

ON →

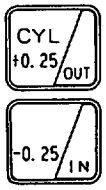
When this key is pressed again, the fine step mode is released.

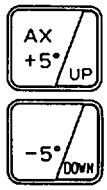
① When the PRISM key is not pressed:

 → Moves in a 0.12D step.

 → Moves in a 1° step.

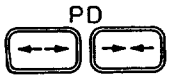
② When the PRISM key is pressed:

 → Moves in a 0.25Δ step.

 → Moves in a 0.25Δ (1°) step.

Note: *The number enclosed in parentheses ( ) is used at prism conversion.*

③ PD

 → Moves in a 0.1 mm step.

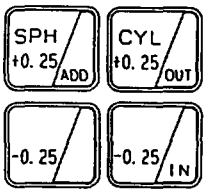
2) For coarse step

Press the

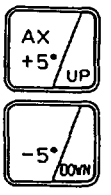
key. → The key step becomes fine as follows:

When this key is pressed again, the coarse step mode is released.

① When the PRISM key is not pressed:

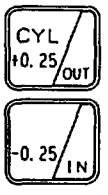


→ Moves in a 1D step.

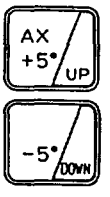


→ Moves in a 45° step.

② When the PRISM key is pressed:



→ Moves in a 1Δ step.

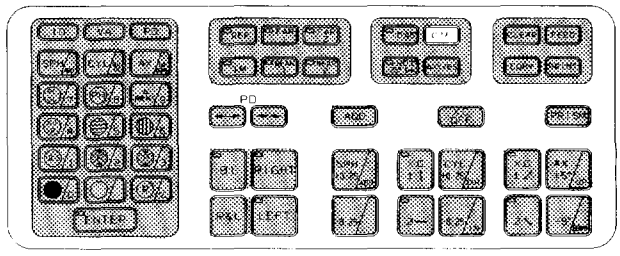


→ Moves in a 1Δ (45°) step.

Note: *The number enclosed in parentheses ( ) is used at prism conversion.*

(13) Converting the cylindrical power

Use the marked keys.



Press the [C+/-] key. → The cylindrical power is converted.

	SPH	CYL	AX
*R	-2.00	-0.50	180 0
*L	-1.00	-0.25	180 0

⟷

	SPH	CYL	AX
*R	-2.50	+0.50	90 0
*L	-1.25	+0.25	90 0

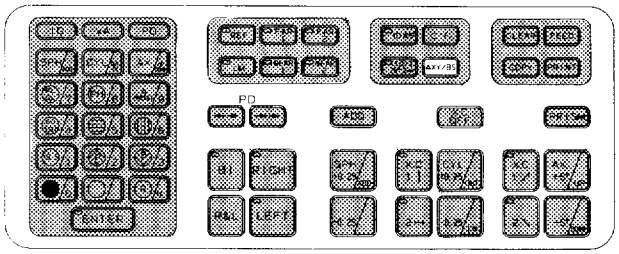
Notes:

1) Press the [C+/-] *key to alternately switch the conversion.*

2) The value specified by the [RIGHT], [LEFT], *and* [R&L] *keys is converted.*

(14) Converting the prism

Use the marked keys.



While holding down the PRISM key, press the ΔXY/BS key.

→ The prism indication unit can be converted.

CYL +0.25/OUT — 0.5ΔBASE OUT ↔ +0.5Δ

-0.25/IN — 0.5ΔBASE IN ↔ −0.5Δ

AX +5°/UP — 0.5ΔBASE UP ↔ +5°

−5°/DOWN — 0.5ΔBASE DOWN ↔ −5°

Control panel LC display example

	SPH	CYL	AX
*R	-2.00	-0.50	180 0
L	-1.00	-0.25	180 0

	PX	PY
*R	3.00BI	3.00BD
L	1.00BI	2.00BD

⟷

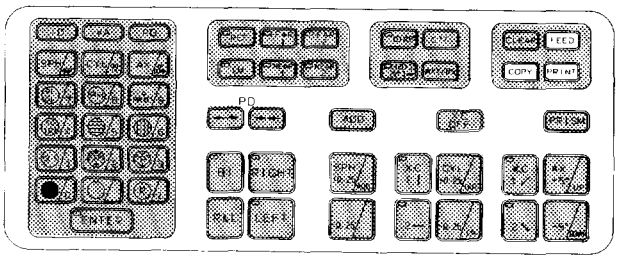
	SPH	CYL	AX
*R	-2.00	-0.50	180 0
L	-1.00	-0.25	180 0

	P	BS
*R	4.25	315
L	2.25	243

Note: *The prism indication units for both eyes are converted regardless of* RIGHT *or* LEFT *key operation.*

(15) Printing

Use the marked keys.



1) To print data during measurement:

Press the COPY key. → Only the data that appears on the LC display of the control panel is printed. The lens and display contents remain unchanged.

2) To print all the data after the measurement ends:

Press the PRINT key. → All the measured data is printed. The lens and display contents then return to the initial state and the stored data is erased.

3) To feed paper:

Press the FEED key. → The printing paper is fed. Holding down the FEED key feeds the printing paper continuously.

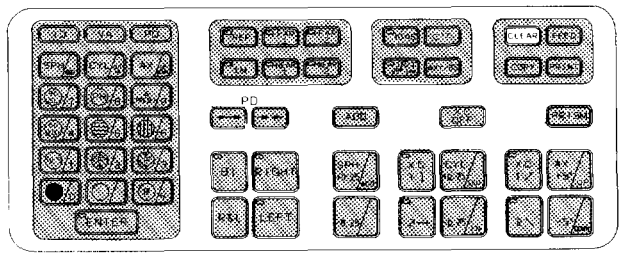
Notes:

1) Print data can be selected at initialization. (Contact your Nikon representative.)

2) Changing the initial values enables the user to send the measured data to a personal computer using the COPY and PRINT keys. (Contact your Nikon representative.)

(16) Erasing data
Erase all the data.

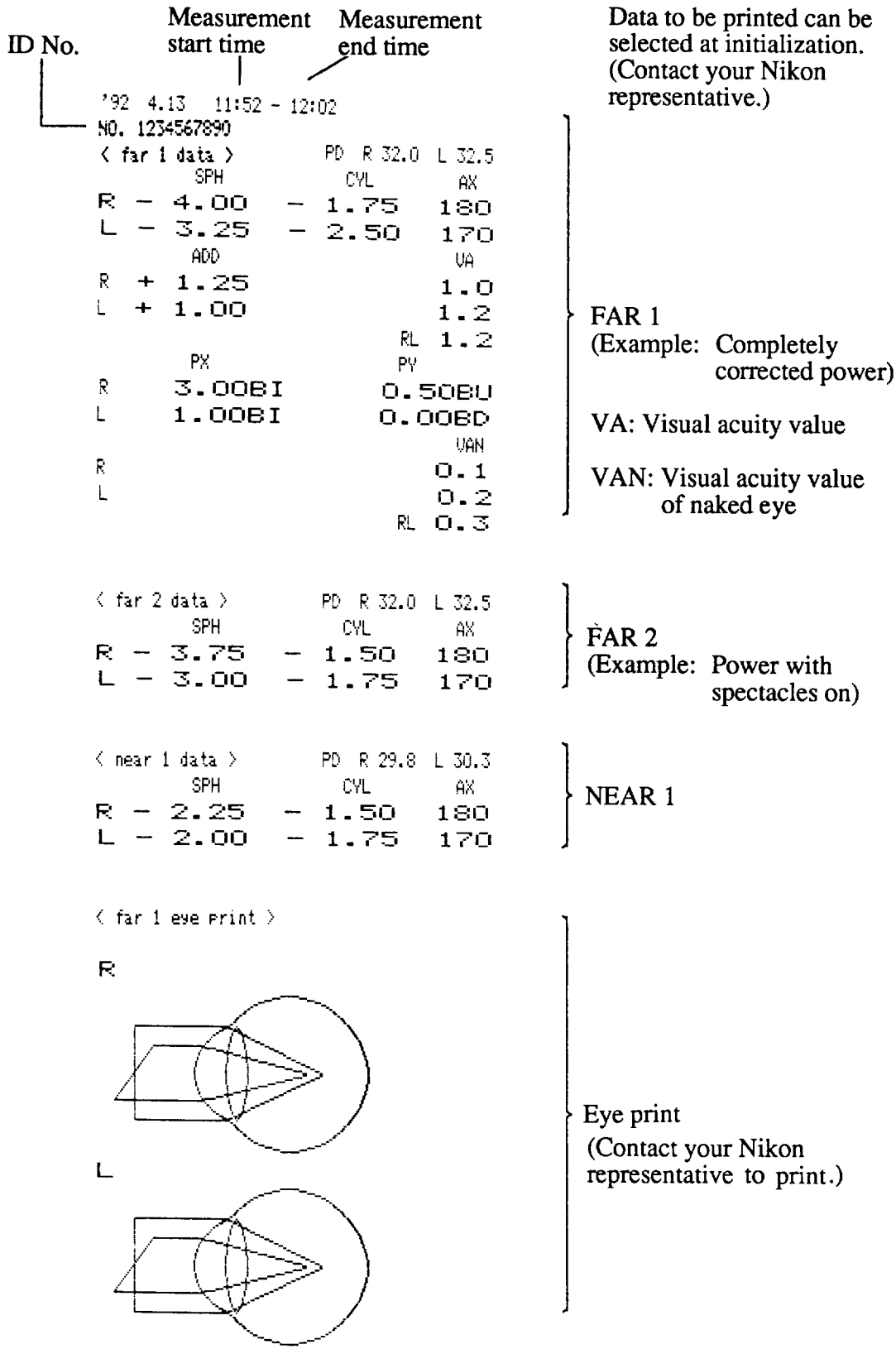
Use the marked keys.



Press the [CLEAR] key twice. → All the data is erased. The lens and display contents then return to the initial state.

Note: *While the* [CLEAR] *key is held down, if another key is pressed, the key has priority over the* [CLEAR] *key.*

5. *Printout Example*



Data to be printed can be selected at initialization. (Contact your Nikon representative.)

FAR 1
(Example: Completely corrected power)

VA: Visual acuity value

VAN: Visual acuity value of naked eye

FAR 2
(Example: Power with spectacles on)

NEAR 1

Eye print
(Contact your Nikon representative to print.)

6. *Multi Remote Control*

6-1. Types of Multi Remote Controls

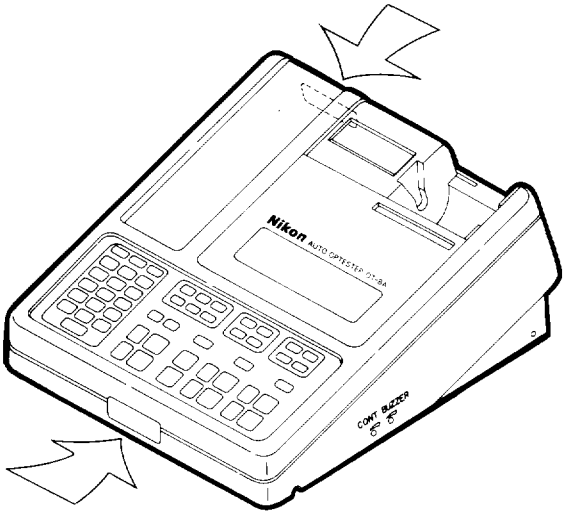
There are the following eight types of multi remote controls that are optional:

- OT-8A remote control (See Figure 6-1.) → P.52
- NP-3 (decimal notation model)/OT-8A remote control (See Figure 6-2.) → P.52
- NP-3 (20/20 letters chart model)/OT-8A remote control (See Figure 6-3.) → P.52
- NP-3 (20/20 letters and multiple chart model)/OT-8A remote control (See Figure 6-4.) → P.53
- NP-3S (European letters and E multiple chart model)/OT-8A remote control (See Figure 6-5.) → P.53
- NP-3S (numbers chart model)/OT-8A remote control (See Figure 6-6.) → P.53
- NP-3S (Snellen numbers chart model)/OT-8A remote control (See Figure 6-7.) → P.54
- NP-3SV (20/20 letters and E muiltiple chart model)/OT-8A remote control (See Figure 6-8.) → P.54

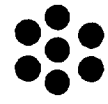
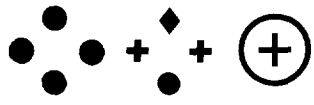
6-2. Operating the CHART and PRINT Keys

- Press any key on the remote control; sound "beep" is heard.
- In cases (1) and (2) on the following page, the chart and OT-8A lens operate together and sound "beep,beep" is heard.
- There are two PRINT keys in the same row. At printing, press these two PRINT keys at the same time.

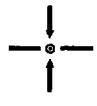
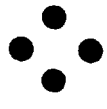
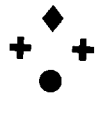
Note: Data from the remote control is received by the OT-8A. Turn the remote control to the remote control receiving window on the OT-8A control panel, then press the required key. (Even if the remote control is turned to the chart, the OT-8A does not operate.)



(1) Pressing a specific chart key shown in column A) on the remote control automatically sets the lens in the OT-8A sight aperture as shown in column B).

Used remote control	A) Set chart	B) OT-8A lens for chart specified in column A)	OT-8A at changing from the chart specified in column A) to another chart
For NP-3(S)/OT-8A		CYL XC1	XC OFF
	The other binocular sight chart	Auxiliary lens P1 Binocular vision state ON	The auxiliary lens for both eyes are opened. R&L
		Auxiliary lens RL.GL Binocular vision state ON	Binocular vision state OFF R&L

(2) Pressing a specific auxiliary lens key shown in column A) on the OT-8A control panel automatically sets the chart shown in column B).

Used remote control	A) OT-8A auxiliary lens	B) Chart for auxiliary lens shown in column A)
For NP-3(S)/OT-8A	Auxiliary lens P1 or P2	NP-3 NP-3S
		NP-3S
		NP-3S 
	Auxiliary lens RL.GL	NP-3 
		NP-3S 

6-3. Operating the PROGRAM Keys

(1) Setting a program

① Press the SET key.

↓

② Press the 1 or 2 key; a long sound "beeep" is heard.

↓

③ Press the required CHART key. (If you press a wrong key by mistake, press the correct key.)

↓

④ Press the SET key; a long sound "beeep" is heard and the chart specified by the CHART key in step ③ is set.

↓

⑤ Repeat steps ③ and ④. Up to 16 types of charts can be set. (If you try to set the 17th chart, alarm sound "beeep,beep,beep,beep" is heard.)

↓

⑥ Finally press the OUT key; the setting of the 1 or 2 key is completed.

(2) Operating the program after setting

① Press the 1 or 2 key.

↓

The first set chart appears.

On the LC display of the OT-8A control panel, <PROG 1> or <PROG 2> appear.

② Each time the chart program forward key (▶) is pressed, the set charts are switched in sequence.

If the chart program reverse key (◀) is pressed, the set charts appear in the reverse order.

[During program operation, an ordinary chart key can be used.

To return the current program to the first program, press the 1 or 2 key.]

↓

③ After the last chart appears, the end sound "beeep,beep,beep,beep" is heard.

↓

④ Press the OUT key; an ordinary key operation is possible.

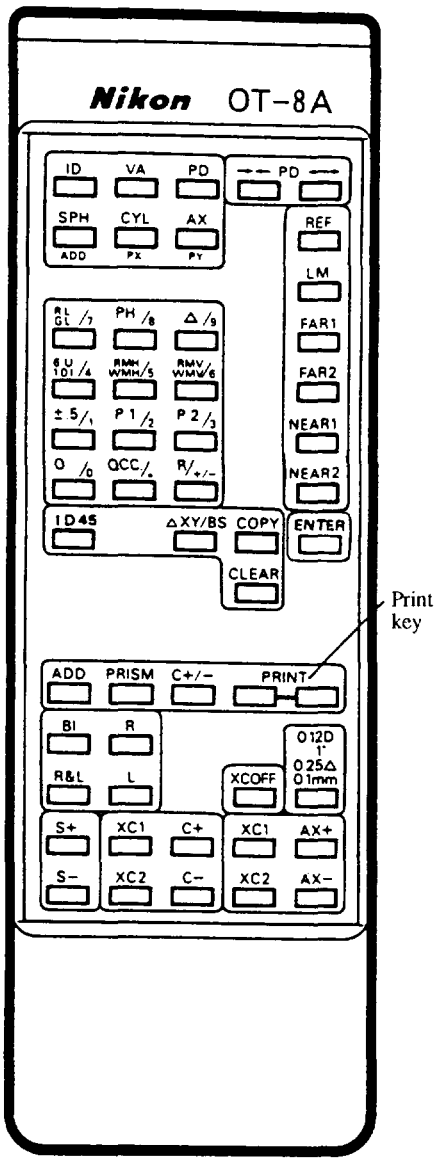


Figure 6-1 OT-8A remote control

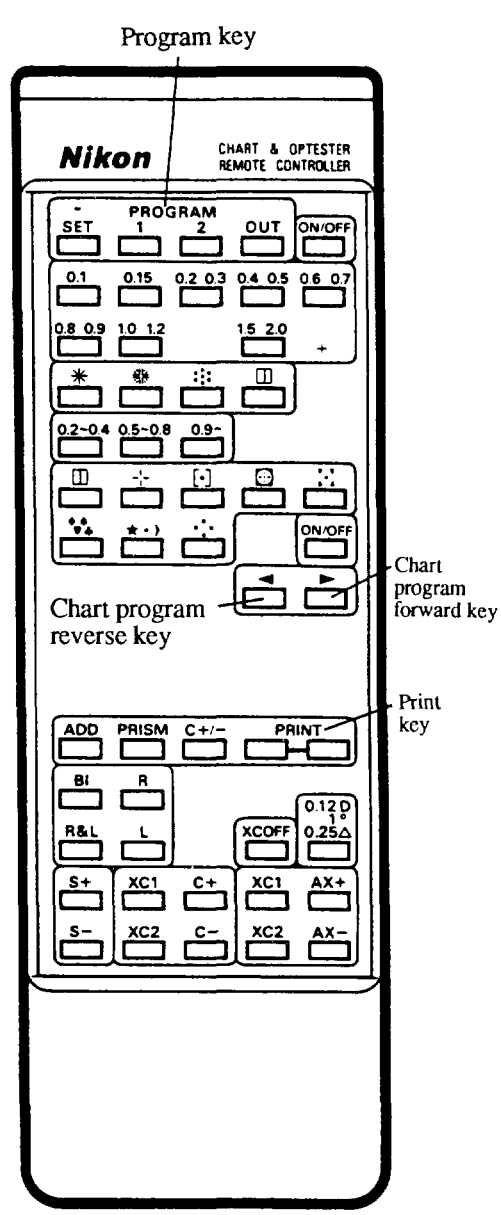


Figure 6-2 NP-3 (decimal notation model)/OT-8A remote control

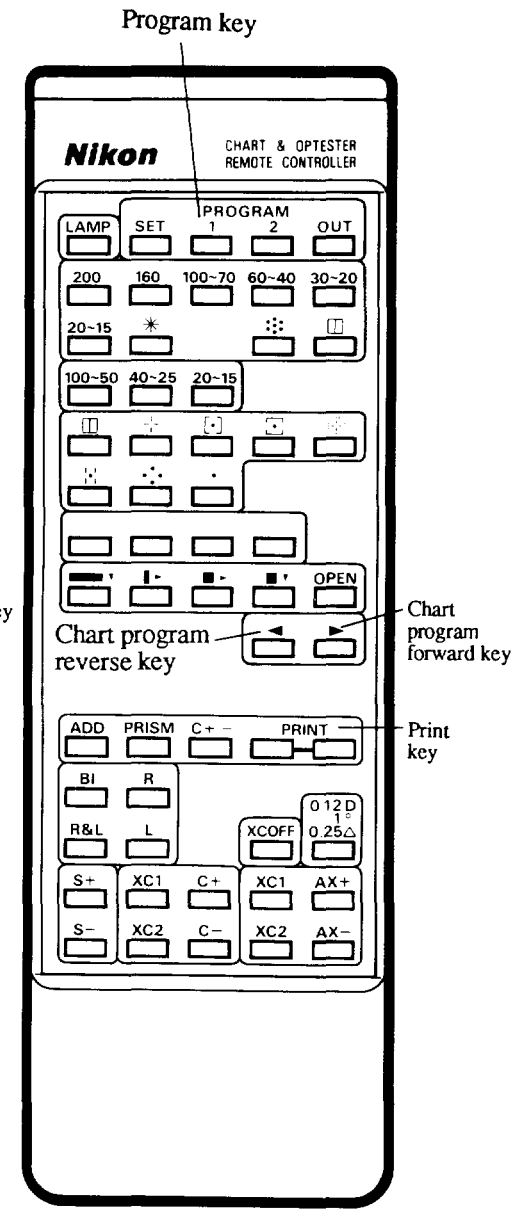


Figure 6-3 NP-3 (20/20 letters chart model)/OT-8A remote control

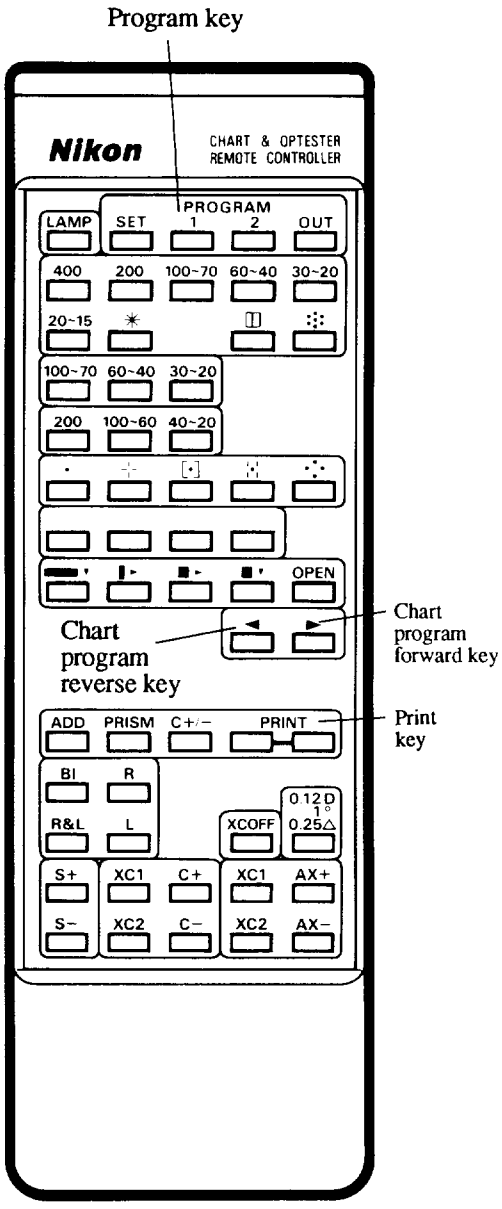


Figure 6-4 NP-3 (20/20 letters and E multiple chart model)/ OT-8A remote control

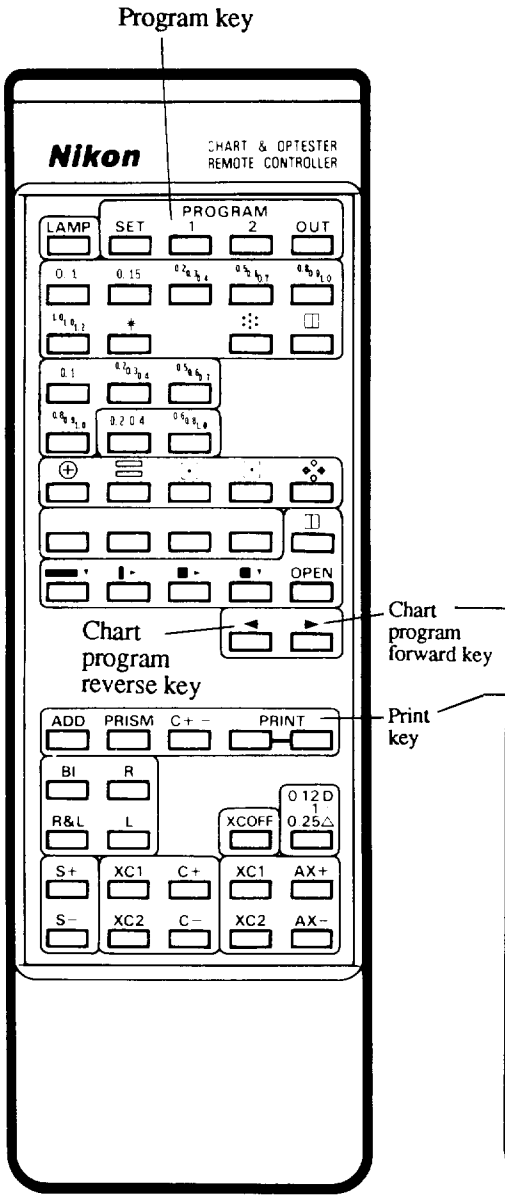


Figure 6-5 NP-3S (European letters and E multiple chart model)/OT-8A* remote control

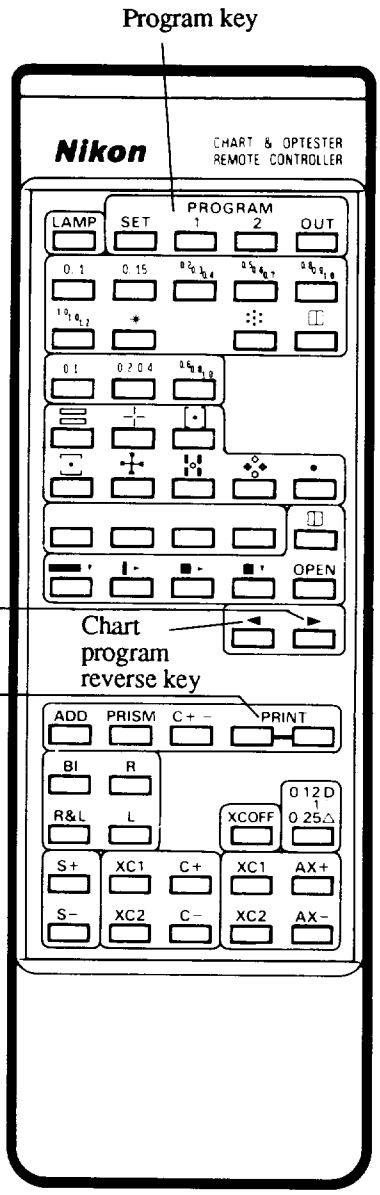


Figure 6-6 NP-3S (numbers chart model)/OT-8A* remote control

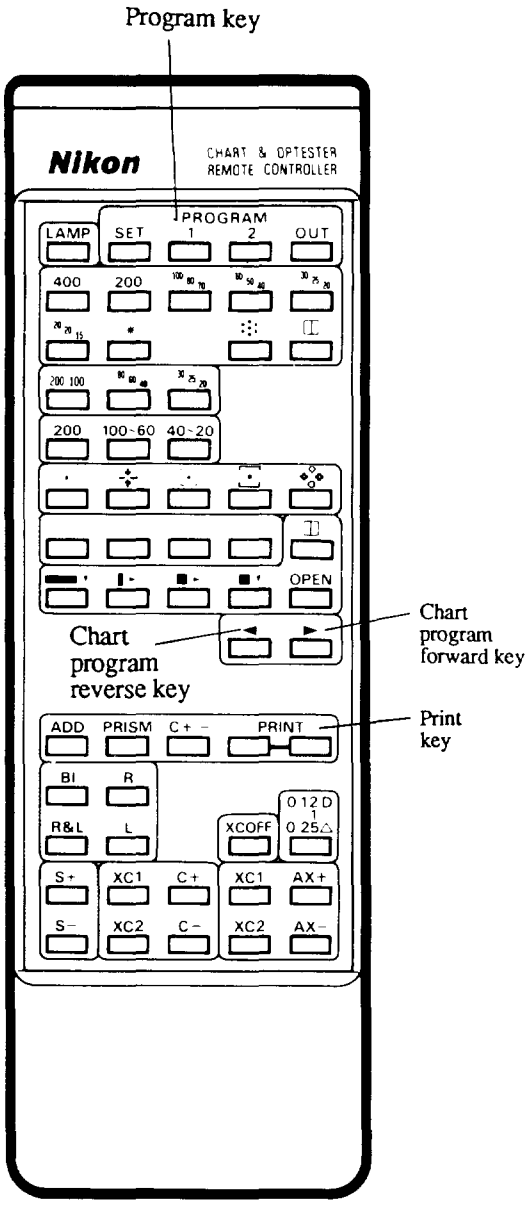


Figure 6-7 NP-3S (Snellen numbers chart model)/OT-8A* remote control

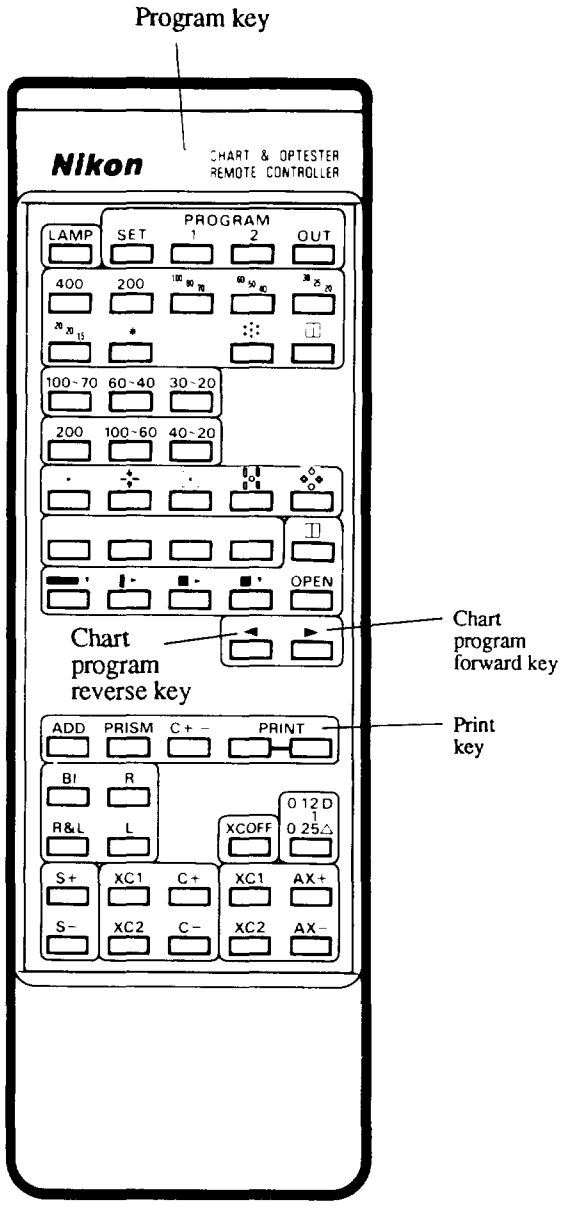


Figure 6-8 NP-3SV (20/20 letters and E multiple chart model)/OT-8A* remote control

(* Remote controls of Figure 6-5, 6-6, 6-7 and 6-8 can not be used with the old model OT-7A.)

7. IC Card Reader/Writer

(The IC card reader/writer is optional.)

7-1. Reading the IC Card

(1) Set the initial state.
(IC card data can be read only in the "initial state".)

The "initial state" means the following:

1) After the power is turned on

2) After the [CLEAR] key is pressed twice to erase data

3) After the [PRINT] key is pressed

↓

(2) Insert the IC card as shown below.

Note: *Turn the surface of the IC card toward you before insertion.*

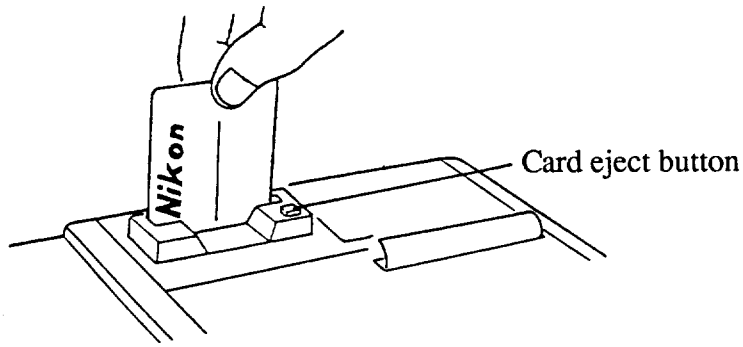


Figure 7-1

↓

(3) After a few seconds lapsed, data reading is completed. Then, the IC card is automatically ejected.

ON → [REF] or ON → [LM]

Note: *When the IC card is automatically ejected, press the card eject button. (See Figure 7-1.)*

(4) Press the [REF] or [LM] key.

↓

(5) Pressing the [ENTER] key sets the lens corresponding to the read data in the OT-8A sight aperture.

7-2. Writing Data into the IC Card

(1) Insert the IC card as shown in Figure 7-1.

(2) Press the PRINT key.

(3) After data is written into the IC card, the IC card is ejected.

Note: When the PRINT key is pressed once without inserting the IC card, no operation is performed.

↓

→ *Insert the IC card, then press the PRINT key again; data is written and printed.*

→ *If the PRINT key is pressed again without inserting the IC card, data is only printed. In this case, data is cleared without being written.*

7-3. Types of IC Card Built-in Data

1) The OT-8A IC card reader/writer can read the following data from an IC card:

At measurement by Nikon Auto Refractometer

- SPH
- CYL
- AX
- ID number (automatically set by the Auto Refractometer)
- PD (only at connection with NR-5100)
- Name (only at connection with NR-5100)

At measurement by Nikon Auto lensmeter

- SPH
- CYL
- AX

2) The OT-8A IC card reader/writer can write the following data into an IC card:

- SPH
- CYL
- AX
- ADD
- PX (Horizontal prism)
- PY (Vertical prism)
- PD

8. *Maintenance*

8-1. Replacing the Fuse

After the POWER switch is turned on (the "|" side of the switch indicator is pressed), when no LED lamps light on or the lens is not set in the sight aperture, the fuse may have blown.

(1) Turn the POWER switch off (press the "O" side of the switch indicator). Then, disconnect the power plug from the outlet.

(2) Nip the right and left claws of the fuse box at the rear of the control panel using the end of the screwdriver, then pull out the fuse box. The fuse box in which the fuses are built is removed.

(3) Replace the removed fuses with the new 2A/250V (short) fuses.

(4) Match the projection of the fuse box with the notch of the control panel, then insert the fuse box firmly deep inside.

(5) Check whether the operating input voltage is displayed in the voltage indicator window. If a different voltage is displayed, correct the direction of the fuse holder so that the correct display appears.

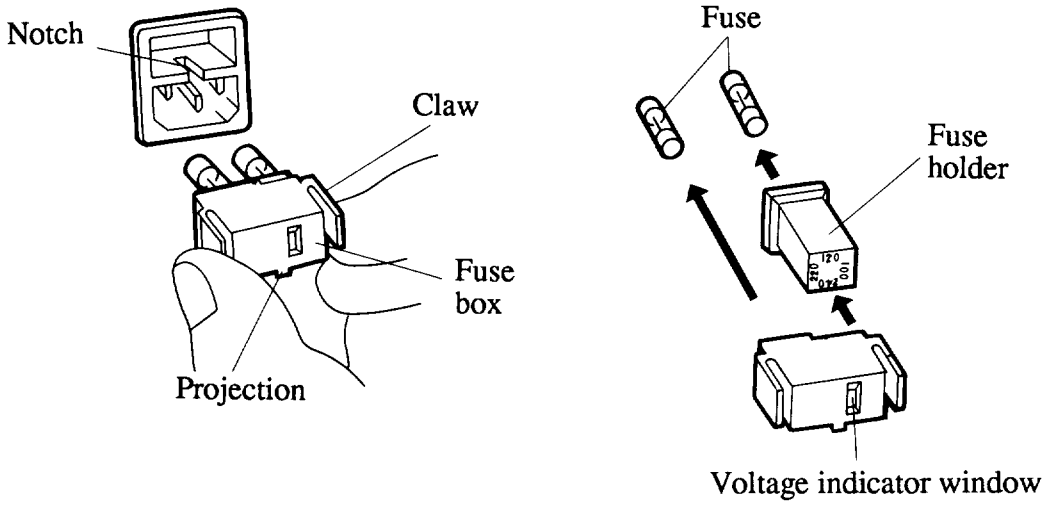


Figure 8-1

8-2. Adjusting the LC Display Contrast and Buzzer Volume

To adjust the LC display contrast and buzzer volume, turn the respective knobs at the right side of the control panel using the end of a small screwdriver. (See Page 2.)

9. *Specifications*

Spherical power

Measurement range: −28.50D to +26.75D

Measurement step: 0.25D (0.125D min.)

However, $-28.50D \leqq \text{Spherical power} + \frac{\textit{Cylindrical power}}{2} \leqq +26.75D$

Cylindrical power

Measurement range: −7.00D to +7.00D

Measurement step: 0.25D (0.125D min.)

Cylindrical axis

Measurement range: 0-180°

Measurement step: 5° (1° min.)

Auxiliary lenses: 11 types

For left eye	For right eye
• Open aperture	• Open aperture
• Occluder	• Occluder
• Lens for retinoscope 1.50D (at shipment) or 2.00D	• Lens for retinoscope 1.50D (at shipment) or 2.00D
• Pin hole	• Pin hole
• ±0.5D cross cylinder for presbyopia	• ±0.5D cross cylinder for presbyopia
• Horizontal maddox rod (white)	• Horizontal maddox rod (red)
• Vertical maddox rod (white)	• Vertical maddox rod (red)
• Polarizing filter (Transmission axis 45° as viewed from operator)	• Polarizing filter (Transmission axis 135° as viewed from operator)
• Polarizing filter (Transmission axis 135° as viewed from operator)	• Polarizing filter (Transmission axis 45° as viewed from operator)
• Prism 10ΔBI	• Prism 6ΔBU
• Green filter	• Red filter

Cross cylinders: ±0.50D (at shipment) or ±0.25D

Prism

Measurement range: 0-20Δ (all directions)

At near distance: IN direction = 0-10Δ

OUT, UP, and DOWN directions = 0-20Δ

Measurement step: 0.5Δ (0.25Δ min.)

Diameter of effective aperture: 18.5 mm

Eyepoint: 6.5 mm

PD adjustment: 25-40 mm for each eye
(Step for each eye: 1 mm, Minimum step for each eye: 0.1 mm)

Main unit swing angle: More than 5° (right and left)

Forehead rest adjustment: 12 mm approx.

Near distance adjustment: The lens axis swings to 330 mm before eye.
(2.2 mm each decentering by prism)

Dimensions Main unit: 396 (W) × 346 (H) × 126 (D) mm

OT-8A keyboard unit: 280 (W) × 327 (H) × 147 (D) mm

Weight Main unit: 6.2 kg approx.

Control panel: 5.3 kg approx.

Input power voltage: 120V, 220V, 240V (common to 50/60 Hz)

Power consumption: 70 VA

Fuse: 2A/250V

Interface: Interface function to two RS-232Cs

OT-8A accessories: Multi remote control (OT-8A + NP-3(S) chart operation)
IC card reader/writer